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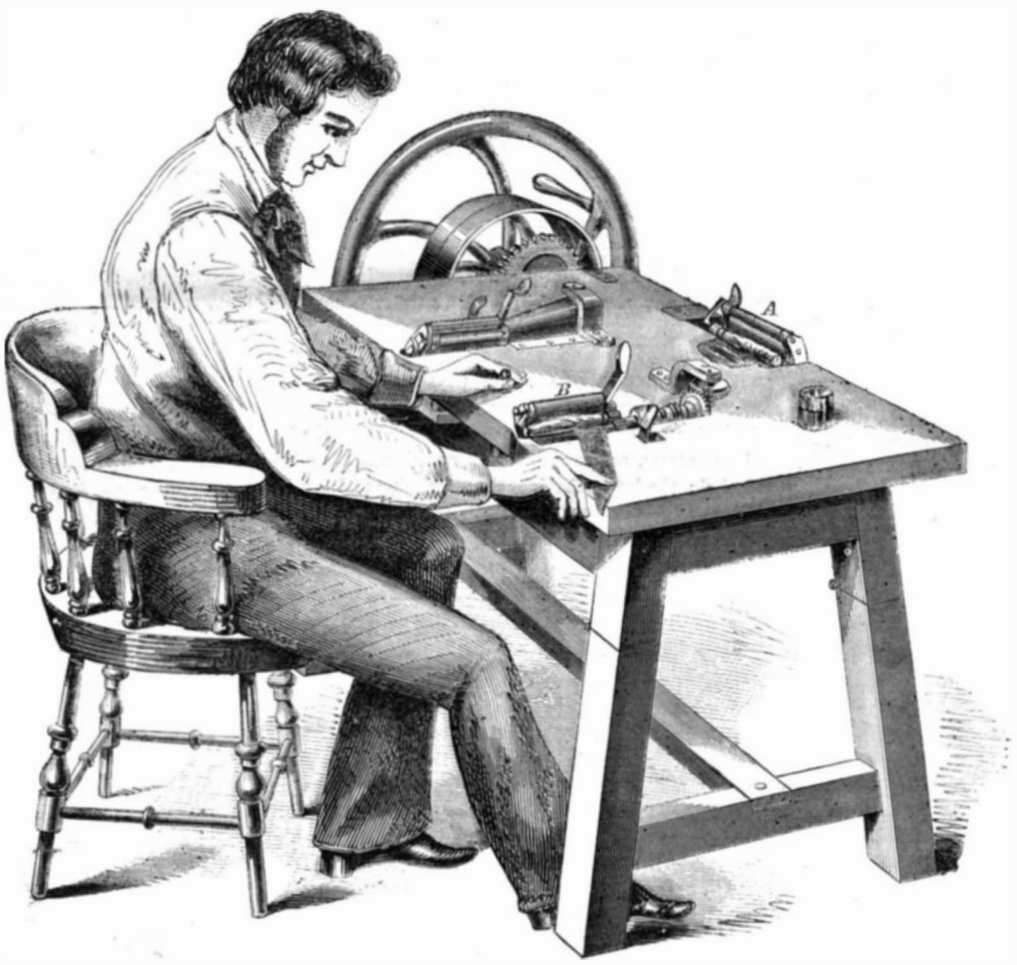
VOL. 1.—No. 16 NEW YORK, OCTOBER 15, 1859. NEW SERIES.

IMPROVED MACHINE FOR MAKING CIGARS.

It appears to us that of all the known *arts* this is perhaps the most funny. To think of a man making a chimney of his mouth, for amusement and gratification, is really a droll idea. Of the history of tobacco we are told that it was in the first week in November, 1492, that Europeans first noted the Indian custom of tobacco-smoking. The two sailors sent by Columbus to explore Cuba returned to the ships of their great commander, and told this, among other thnigs new and strange,. They found the natives carried with them a lighted fire-brand, and puffed smoke from their mouths and noses: this their European notions led them to conclude was some mode of perfuming themselves. A more intimate acquaintance with the natives taught them that it was leaves of a certain herb, rolled up in the dried leaves of the maize or Indian corn, that they thus burned, and inhaled the smoke. It was a novelty to the Spaniards, but it was an ancient and familiar custom with the natives. The Spaniards, however, soon imitated the natives in this singular practice; and the custom has since become so general throughout the civilized world, that it is now necessary to introduce machinery into the manufacture of cigars. A machine for thi purpose has been invented in France and brought to this country.

We noticed this machine on the 20th of August last, giving some account of its power of accomplishment, in connection with some statistics of the consumption of cigars, showing the enormous saving it was estimated that it would effect in this department of labor. The principle of the machine consists in rolling the pieces of tobacco leaf between two elastic endless bands which run in opposite directions. Two pairs of these endless bands are prepared—one for rolling together the filling of the cigar and the other for winding the wrapper.



BEAUCHE'S CIGAR-MAKING MACHINE.

The annexed engraving is a perseuctive view of the machine in operation, A being the pair of hands for preparing the filling, and B the pair for putting on the wrappers. The frame of the upper band is hung on hinges at one side so that it may be turned open. The operator gathers a bundle of pieces of tobacco-leaf, previously cut of the proper length, and places them upon the lower band with a smooth piece of leaf loosely around them. He then presses down the frame of the upper band, bringing it into gear with the lower band, where it is held by a latch. He then throws the two bands into gear with the driving machinery, and the bundle of tobacco is rapidly rolled by the two bands between which it is pressed, which run in opposite directions. The effect of this operation is to press the bundle together and sufficiently tighten the inner wrapper about it. The apparatus for winding the wrappers is provided at one end with a hollow metallic cone, partly formed with a revolving roller, for finishing the pointed end of the cigars and giving a twist to the wrapper which prevents it from unwinding. The upper band of this apparatus being turned open, the wrapper, previously cut of the proper reniform shape, is placed with one end upon the lower band near its end, and the filling, prepared as before described, is then laid upon it and the apparatus is closed and thrown into gear with the driving machinery. The two endless bands running in opposite directions roll the cigar between them, and as the wrapper is held at an angle by the operator, it is drawn in and wrapped around the filling, forming the cigar. The rotary motion is continued until the pointed end of the cigar is rubbed smooth and handsomely finished by its revolutions in the metallic cone. The upper band now being turned open, the cigar is taken out and the square end cut off, when it is ready for market.

This machine is the invention of Louis Beauché, of Paris, France, who has taken out patents in the principal countries of Europe. His American patent was issued May 22, 1856. He has a machine in operation at No. 77 Cedar-street, New York, which we have seen. It certainly makes a very handsome cigar, and Mr. Beauche claims that it is the first machine which has ever practically produced this result, or which has received the approval of English, French and German mechanicians. Further information may be obtained by calling on the inventor or addressing him as above.

SILVERING ANIMAL VEGETABLE, AND MINERAL SUBSTANCES.

Liquor No. 1.—Take two parts, by weight, of caustic lime, five of sugar of milk or grape sugar, two of gallic acid, and make of them a mixture in 650 parts of distilled water; filter, protected from the air as much as possible, and put in a closely stopped bottle until moment or using.

Liquor No. 2.—Dissolve 20 parts of nitrate of silver in 20 parts solution of ammonia, and add to this solution 650 parts of distilled water.

The two preceding liquors are mixed in equal quantities and, after having been well agitated, are filtered.

As the solut on of ammonia of commerce has not always the same degree of concentration, it would be better, perhaps, to dissolve the nitrate of silver destined for the liquor No. 2, first in distilled water, then mix this solution with liquor No. 1, and only then add ammonia in quantity sufficient to entirely clear the mixture, taking care always not to maintain an excess greater than is necessary to prevent the silver from being precipitated.

Suppose it is intended to silver silk, cotton, woolen, &c., we commence by washing the substance clean; this done, we immerse it for a moment in the saturated solution of gallic acid; then withdraw it to plunge it for a second in another solution composed of 20 parts of nitrate of silver to 1,000 parts of distilled water. These alternate immersions are continued, until the substance from being dark becomes of a brilliant tint; after which it is plunged in a bath composed of a mixture of the two liquors Nos. 1 and 2. When it is complely silvered it is withdrawn and boiled in a solution in water of a salt of tartar, and there remains nothing more to be done but a last washing and drying.

Stucco and pottery ought, before being submitted to the operation, to be covered with a coat of stearin or varnish.

The silvered surfaces are then washed with distilled water, dried by free air and heat, in the last place covered with a layer of varnish. The deposition of silver can be accelerated by the employment of heat; in this case the temperature depends upon the nature of the objects to be submitted to the operation.

As for the metals, we commence by cleaning them with nitric acid; rub them afterwards with a mixture of cyanide of potassium and powdered silver; then after washing with water, they are plunged alternately into liquors Nos. 1 and 2, until they appear sufficiently silvered. If working with iron, it should be first immersed in a solution of sulphate of copper.—*Jour. de Chim. Med.*

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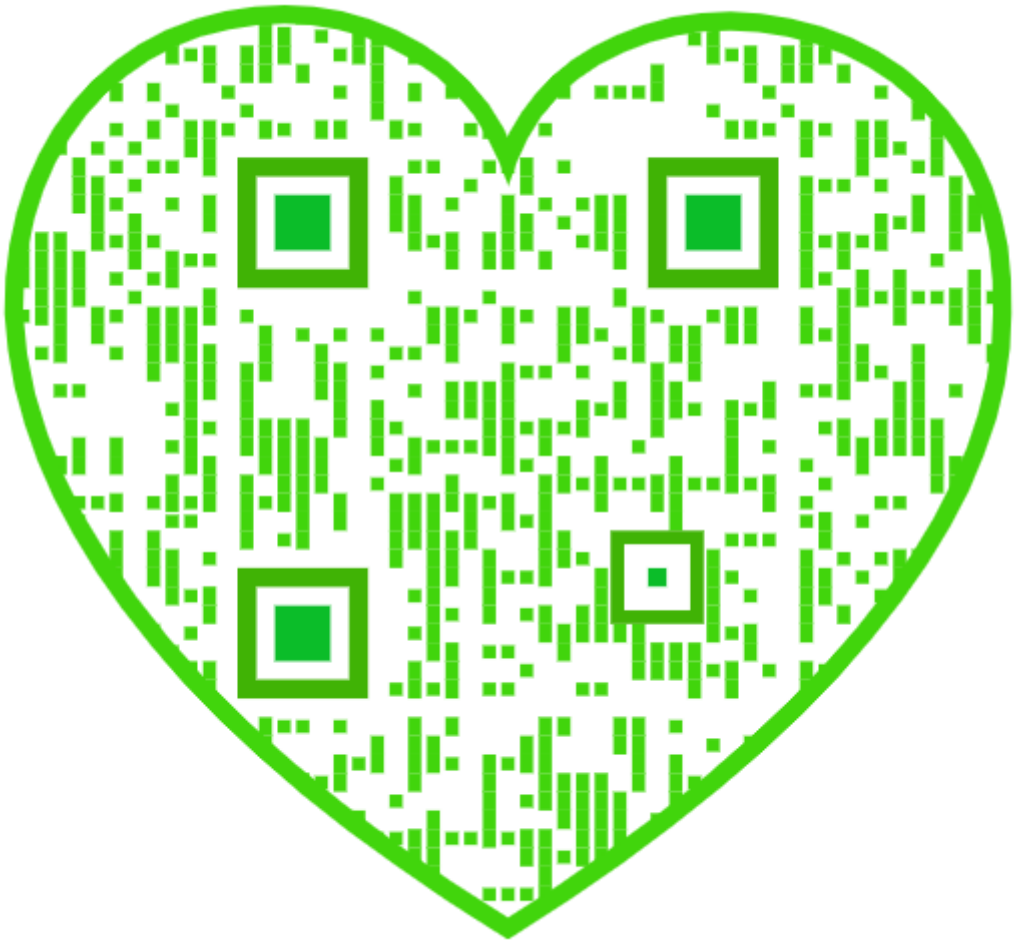

ADULTERATED FOOD AND MEDICINES.

At the eighth annual meeting of the American Pharmaceutical Association held at Boston last month, a committee appointed to examine articles of food and medicine for home consumption, to detect adulterations, presented a fearful list. We publish some of these, as reported by Dr. C. J. Carney, of Boston, Mass.:—

Colored Confectionery—adulterated with emerald or schules green, arsenite of copper. Beer—with cocculus indicus and nux vomica. Pickles and Bottled Fruits—with verdigris and sulphate of copper. Custard Powder—with chromate of lead. Tea and Snuff—with the same. Cayenne and Curry Powder—with red oxyd of lead. Sugar Confectionery—with gamboge, orpiment, or sulphuret of arsenic, and chloride of copper. Flour and Bread—with hydrated sulphate of lime, plaster-of-Paris and alum. Vinegar—with sulphuric acid. Sugar—with sand and plaster-of-Paris. Arrow Root—with ground rice. Chocolate—with rice flour, potato starch, gum tragacanth, cinnabar, balsam of Peru, red oxyd of mercury, red lead, carbonate of lime, and the red ochers to bring up the color. Mustard—with ground turmeric, to give it a brilliant color. Butter—with potato starch, mutton tallow, carbonate and sugar of lead. Tartaric acid—with cream-of-tartar, acid sulphate of potassa and with lime. Starch—with carbonate and sulphate of lime or alabaster; the more common fraud is, however, to saturate it with moisture. Beeswax—with resin, Burgundy pitch, earthy matter, flour of sulphur, starch and amlyaceous substances, tallow, stearic acid, yellow ocher, calcined bones and sawdust Manna—with glucose or starch sugar, and starch. The large flake manna is sometimes made from a mixture, consisting of a little manna, flour, honey, and a purgative powder; these are boiled together to a sirupy consistence, and then molded in form of "flakes;" common "sorts manna" has been converted into "flake" by being boiled in water, clarified with charcoal, and molded into proper form.

A number of specimens were then presented, and remarked upon as follows:—

Cream-of-tartar is very largely adulterated. Some of the articles used for the purpose are in one sense harmless; but many of them are decidedly pernicious, and all of them are to be condemned because sold to deceive the community and enrich the adulterator. It is adulterated with tartrate of lime, chalk, finely powdered white marble, sulphate of lime, sand, nitrate of potassa, alum, sulphate of soda, and potassa, chloride of potassium, and starch. The easiest way to detect the adulteration with starch or farinaceous substances is by testing a cold solution of the cream-of-tartar with a solution of iodine. The characteristic blue "iodine of starch" will at once be apparent. If we treat the cream-of-tartar with boiling water, we dissolve all soluble substances, leaving behind the tartrate of lime, quartz, clay, and sulphate of lime, and other insoluble impurities. As cream-of-tartar is used very extensively, its adulteration should deter persons from employing it in cooking.

Some ground coffee was found to contain 60 pounds of common peas, 20 pounds of chicory, and 20 pounds of coffee in every 100 pounds, which was labeled "Fine Old Java." A member of the committee had seen in a wood-turner's shop, in Boston, more than a barrel of East India rhubarb which was being turned down into "true Turkey." This rhubarb was sold for genuine and real Turkey rhubarb.

While the committee hesitated to give the names o the parties guilty of this practice, it was recommended that the association should take some action in reference to the subject.

Dr. Jackson, of Boston, made some excellent remarks at this convention. He said that since the passage of the foolish law with regard to examination at the custom-houses, no regular analyses have existed, and at the custom-house they are impossible. Leather is dyed with Nicaragua wood instead of cochineal. The Nicaragua wood-dye fades with time; the cochineal does not. After a month's unsuccessful labor by one of his students, in a case where this substitution was suspected, he had himself undertaken the test, and, on the information from the owner of its tendency to fade, took strips of the suspected article and of genuinely dyed leather, placed the two in chlorine, and found the color of the Nicaragua wood to disappear entirely, while the cochineal only changed to brown.

Wm. A. Brewer, of Boston, had found cochineal adulterated with barytes. The adulterated article may be distinguished by its marked excess of weight, it occupying little more than half the space of true cochineal.

Mr. Dix, of New York City, said that this cochineal came from London. Some years ago it was discovered there, by the Messrs. Berger, that they could take out the best part of the color without destroying the cochineal. They sell it there, immediately to other firms, and it is dried, and colored with barytes. Mr. Dix urged the extention of the association as the best means of checking adulteration.

The proceedings of this convention should open the eyes of our people to the general base system of adulterating food, and should lead to the appointment of sanitary committees composed of scientific, honorable men in all our cities.

DETECTING ADULTEROUS SUBSTANCES IN BEER.

To detect lead, copper, calcareous salts, tartaric acid, strychnine, bucina, henbane, cocculus indicus, &c., a few tests will suffice. The copper, for instance, may be discovered by evaporating the beer to the consistency of an extract; incinerating the latter, and treating it with dilute nitric acid, which will assume a bluish color, and become darker by the addition of ammonia. If a piece of iron scoured with dilute sulphuric acid be then introduced into the solution, the former will be precipitated upon it in a metallic state. The presence of lead will be made evident by sulphate of soda, which produces a white precipitate; oxalate of ammonia will effect a similar precipitate if the liquid contain calcareous salts; tartaric acid may be detected by a solution of potash poured on the extract, re-dissolved in water, which will give a granular precipitate. To detect the (by no means unusual) substitution in beer of various narcotic and other ingredients for hops, is somewhat more difficult; many of these, nevertheless, may be easily recognized. These latter coloring or intoxicating drugs consist (usually) of the leaves of the box-tree, of the menyanthes, various kinds of mint, the flowers of the linden-tree, gentian (but rarely), poppyheads, guaiacum or lignum-vitæ, Spanish juice, henbane, grains-of-paradise, cocculus indicus, cayenne pepper, nux vomica, and a powder composed of sulphate of copper, persulphate of iron, fecula, and some extract or other of a bitter and astringent nature. The nux vomica, and other drugs of the strychnos genus, all more or less stupifying. tetanus-producing, or otherwise deleterious, may easily be detected by reducing the beer to an extract, as above directed, and then treating it by alcohol; the latter dissolves the strychnine and brucine. The vegetable basis of the family of the strychnæ, and their nature, may be tested by sulphuric acid and bichromate of potassia.—*London Artisan.*

ARTIFICIAL DUCK-HATCHING.

In Chusan, China, there is an old man who hatches duck-eggs in thousands, every spring, by artificial heat, and a correspondent of the London *Athenæum* states that he is quite a "lion" to the strangers who visit that city. The hatching-house is built alongside of the Chinaman's cottage, and is a kind of long shed, with mud walls, and thickly thatched with straw. Along the ends and down one side of the building are a number of round straw baskets, well plastered with mud to prevent them from taking fire. In the bottom of each basket there is a tile placed, or rather the tile forms the bottom of the basket; upon this the fire acts, a small fireplace being below each basket. The top is open, having of course a straw cover, which fits closely, and which covers the eggs when the process is going on, the whole having the appearance of a vase placed upon a pedestal. In the center of the shed there are a number of large shelves placed one above another, upon which the eggs are laid at a certain stage of the process.

When the eggs are brought they are put into the baskets described above, the fire is lighted below, and the heat kept up to range from 95 to 102 degrees; but the Chinamen regulate the heat by their own feelings, and not by thermometer, and therefore it will of course vary very considerably. In four or five days after the eggs have been subject to this temperature, they are taken carefully out, one by one, to a door in which a number of holes have been bored exactly the size of the eggs; they are then held in the holes, and the Chinamen look through to the light, and they are able to tell whether they are good or not. If good, they are taken back and replaced in their former quarters; if bad, they are of course excluded. In nine or ten days after this, that is about fourteen or fifteen days from the commencement, the eggs are taken out of the baskets, and spread out on the shelves already noticed. Here no fire-heat is applied, but they are covered over with cotton and a kind of blanket, remaining in these circumstances about fourteen days more, when the young ducks burst their shells, and the poor Chinaman's shed teems with life. These shelves are large, and capable of holding many thousands of eggs; and it is really a curious sight, particularly during the two last days, when the hatching takes place. The Chinese who rear the young ducks know exactly the day when they will be ready for removal, and in two days after the shell is burst, the whole of these little creatures are sold, and conveyed to their new quarters.

EAGLES—ORNITHOLOGY.

MESSRS. EDITORS:—In your issue of September 17, there is a communication from J. P. C., in which he claims to have discovered the change of plumage in the Bald or White-headed Eagle. By examining "Nuttall's Ornithology" (LandBirds), 2d edition, published in 1840, you will find this change spoken of as a well-established fact. In his description of the Bald Eagle, page 76, he says:—"The young are at first clothed with a whitish down; they gradually become grey, and continue of a brownish-grey until the third year, when the characteristic white of the head and tail becomes perfectly developed." Again, at page 79, he says:—"In the adult, at the age of three years, all the plumage of the body and the wings is of a deep and very lively brown or chocolate color; the head and upper part of the neck, as well as the tail and its coverts, are of a pure white; but in the female, incline a little to straw color."

While J. P. C. thinks that at least six years are required to effect this change, Mr. Nuttall speaks positively that it is perfected at the age of three years. It is possible that the crippled and captive state, as well as difference of food, in the case of J. P. C.'s bird, may have a tendency to retard the time of this change, and it is possible that the period may be variable, but I should infer that three years would ordinarily be sufficient to develop the full plumage of the eagle, as most other birds have attained the adult and perfect plumage by their second year.

On the 4th of August, 1842, I shot a bald eagle, which I preserved, and it is still in fine preservation. The plumage of this specimen seems to be in the transition state, and I always regarded it as an eagle of the second year. The tail is partly white, and the white of the head and neck is tinged with the ordinary dark color of the body, the bill is yellow as in the perfect adult, while in the young it is black.

J. P. C. will find "Nuttall's Ornithology," in 2 vols., interesting and reliable, and containing copious descriptions of the birds of the United States and of Canada, so far as was known at the time it was published.

W. J. W.

Yaphank, N. Y., September 29, 1859.

[Since the above letter was received, another on the same subject, from V. Barnard, of Kennett Square, Pa., has come to hand, in which he states that the identity of the grey and bald eagles has been known by ornithologists for 50 years. Wilson says that the eagles are grey-brown under three years of age, then the head, tail, &c. become white in the perfect birds. Audubon speaks decidedly in the same strain, and T. M. Brewer, a very shrewd naturalist, states that, in confinement, the eagle does not make the complete change in his plumage until he is about five years old, whereas he does so in the wild state in three years. Mr. Barnard concludes his letter as follows:—"At present I believe ornithologists have reduced all our North American eagles to three species: the Washington Eagle (*Haliætus Washingtonii*; Aud.), Bald Eagle (*Haliætus Leucocephalus*; Aud.), and the Golden Eagle (*Aqualia Crysaetos*; Swain). The old Ring-tailed Black Eagle is now considered to be the young of *Aqualia Crysaetos*, Swain, and the Sea Eagle an immature plumage of *Haliætus Leucocephalus*, Aud. I am very much interested in natural sciences, ornithology, in particular, and hope to see more in your columns upon the subject, believing it would be not only of interest, but of substantial importance to the general reader."—EDS.

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THE TRANS-MUNDANE TELEGRAPH LINE.

The Washington correspondent of the New York *Journal of Commerce* gives the following information about a new gigantic telegraphic enterprise. He says:

"You had occasion lately, in an article upon the project formed simultaneously in Russia, in Canada, and in California, for girding the earth with lines of magnetic telegraph, to observe that they probably originated from no concerted action. The reverse is, however, the case, and the prime mover of these enterprises in Russia and in Canada, is Mr. Collins, the United States Commercial Agent at the Amoor river, whose interesting reports upon the commerce of that region have already attracted so much attention. Mr. Collins drew the attention of the Russian government to the importance of a line of telegraph across its dominions to the mouth of the Amoor, and his suggestions were adopted and will be acted upon. He went to Canada, and there succeeded in the formation of a company, which has been incorporated under the name of the 'Trans-mundane Telegraph Company,' which will afford important aid in establishing the proposed line through British America. The plan is to construct the telegraph from the mouth of the Amoor across Behring's straights to and through Russia and British America. From Victoria a branch will be conducted to San Francisco, and another to Canada. Mr. Collins is now in Washington, but will soon leave for St. Petersburg, where he expects to complete arrangements, through private companies and government subsidies, for completing the line of telegraph from Novogorod to the mouth of the Amoor, and thence taking it across the straights to Russian America. The distance from Novogorod to San Francisco, by the route chosen, will be 5,000 miles. The line from San Francisco to Missouri is commenced, and Mr. Collins thinks that by the time when it will be in operation, he will have extended his line to San Francisco."

WALKING ON THE WATER.

The traditions which have come down to us regarding "The Wandering Jew" attribute to him the wonderful power of walking upon the water as upon dry land. It is stated that upon one occasion, while the Saviour of mankind was faint and weary with the toils of the day, going about doing good in the streets of Jerusalem, he sought to rest for a short period in the stall of a merchant, when he was refused the humble boon and driven forth with curses. As in the doom pronounced against the barren fig-tree, the Lord looked upon him and said, "Cursed art thou; when I shall rest, thou shall wander and find no peace." Endowed with immortality, the Jew is represented to have become a wanderer over the globe, seeking rest and finding none, since the crucifixion. Over seas, rivers, deserts, mountains and plains he now wanders on, ever weary, never resting. The story is fabulous, but it would seem as if a number of persons at the present time were striving to acquire a like power to that which the Jew is represented to possess for walking on the water. A few weeks ago, we related that an inventor in Wisconsin had made attempts to walk on Lake Michigan, at Chicago; and since then, two other persons have really performed the feat of marching on the water at Toronto, C. W., in the one case, and at Oswego, N. Y., in the other. The *Globe*, of the former city, states that Mr. Hickock lately astonished quite a number of spectators by walking for half an hour on the Toronto Bay; and the Oswego *Palladium* states that S. Gardner lately walked across the river at that city, in very deep water, in six minutes. On page 136, Vol. III., of the SCIENTIFIC AMERICAN, we published an illustrated description of a water velocipede—an apparatus for walking the water; but it appears to have been quite different from the means employed by the present aquatic pedestrians. They are represented to use only very large and deep boots, fitted with air-tight floats for supporting the wearers, who walk with a sort of swinging motion, using balancing poles to support them. The new water-walking apparatuses appear to have something desirable and commendable about them; the old water velocipedes were too clumsy and difficult to manage.

CALIFORNIA MATCHES.

Until now the Golden State has never added to its many industrial institutions a single factory for manufacturing those humble but powerful and necessary agents of civilization—friction matches. To her honor and wisdom, however, she has at last commenced the good work, as we learn, by the Sacramento *Union*, that matches are now manufactured in that city by J. T. Haviland & Co. Thus far the California matches have all been made by hand-machines, at the rate of 50 gross per day, but the company have been so far successful, that they have ordered a new splitting-machine from New York, with which they will be able to make 400 gross per diem, using a steam-engine to drive the machinery. The wood used for the California matches is "ginger pine," which is said to be superior to the pine which we use in the East.

The inventor of friction matches was a benefactor to the human race, but although we have made many enquiries as to who this personage was, we were unable until very lately to obtain the desired information. His name as we have learned, was John Walker, a Scotch chemist, and he made the discovery while experimenting with chlorate of potash and sulphuret of antimony. For a long period he kept the secret and made the matches, which he sold for about 30 cents per box, until he realized a handsome fortune. The first friction matches used in our country were imported at the rate of $15 per gross; now matches of a superior quality can be purchased for one dollar per gross. The earliest manufacturer of friction matches in America was Alonzo Phillips, of Springfield, Mass., who obtained a patent on the October 24, 1836, for the use of phosphorus, chalk and glue, as the composition; no chlorate of potash was used. Dr. A. Cooley, of Hartford, Conn., was also an early manufacturer. There is one match manufactory in Herkimer county, N. Y., in which no less than 2,750,000 matches are turned out daily, and one in Brooklyn, N. Y., in which nearly as many are manufactured.

THE UTILITY OF HIGH PREMIUMS.

That a railroad company in Illinois should offer a premium of $3,000 for the best plowing-machine to be worked by steam on the prairies, seemed to many, when first announced, not a little like their stepping out of their line of business, and many a strict constructionist of duty might reasonably feel disposed to enquire whether it was a warantable disposition of the company's funds. But the fact that these western railroads are the largest of landed proprietors next to the United States government, and in that point of view it became a matter of vital importance to do everything to bring the land under cultivation on a large scale, and thus create a demand for it. A steam plow on a western prairie is the very thing most obviously and naturally adapted to bring the land into market, at a high price. A piece of better economy or profitable investment never entered into the minds of a set of directors than that $3,000 given away. Used to steam, themselves, and knowing the ingenuity of mechanics in overcoming difficulties of all sorts, there was no doubt but that a hundred times more than the amount of the premium would be eventually realized in the increased value given to their lands. It has answered, however, beyond their most sanguine expectations. Fawkes' steam-plow has gained the premium, it seems. It is acknowedged as a success; and now, with that premium to recommend him, he can sell his plows and sell patent rights and his fortune is made.

The railroad companies of Illinois have had the conveyance of about 30,000 people. It has been estimated by some that nearly 50,000 were brought together by that fair. The greatest attraction of the whole was that steam plow. The probability is that the railroad company did not receive less than double the amount in ready money for conveying passengers, over and above what they would have received without the fair, and all expenses together. Fifty thousand persons have seen it, and so caught the idea of plowing these rich lands by steam with six or eight plows at a time. Three hundred thousand—yes, three millions of people have read the accounts of it, and so caught the idea. That was the great thing which alone was wanting. This one invention will do more to bring us up to English farming in regard to capital invested that anything else. In a few years we shall have twenty steam plows at work where England has one.

But this is only the beginning of a good thing. Hundreds of the very best mechanical geniuses in the country have been set at work upon the construction of the best steam plows, and for the next twenty years new improvements will be developing themselves. We shall expect to see plows and harrows and drills following one another in such order, that, while before the engine all is the wild, unbroken land of prairie grass, behind them is the sown field, wanting only the effect of a little sunshine and of shower to reverse the ancient picture of desolation caused by the sword and the armies of man. Then it was said, "Before them is them is the garden of the Lord, behind them a wilderness and desolation;" now, it will be the wilderness before and the garden behind, blossoming as a rose. Another even larger premium might yet be offered for the most complete set of farming implements all worked by the same steam engine, that is, an engine capable of doing the greatest variety of farming work now done by horses.—*Philadelphia Ledger.*

[We have long advocated the utility of high premiums for inventions and new improvements by agricultural and mechanical associations, and it affords us much pleasure to present the above well-timed, well-reasoned and intelligent remarks.—EDS.

RELIABLE RECIPES.

A correspondent—J. Q., of New York City—sends us the following recipes, which his personal experience (of over 50 years) enables him to recommend as being almost infallible:—

HOW TO CURE THE CHRONIC GOUT.—Take hot vinegar and table-salt, and bathe the parts affected with a soft piece of flannel. Rub in with the hand, and dry the foot, &c., by the fire. Repeat this operation four times in the 24 hours, 15 minutes each time, for four days; then twice a day for the same period; then once; and follow this rule whenever the symptoms show themselves at any future time. The philosophy and chemistry of the above formula is as follows:—Chronic gout proceeds from the obstruction of the free circulation of the blood (in the parts affected) by the deposit of a chalky substance, which is generally understood to be a carbonate and phosphate of lime. Vinegar and salt dissolve these; and the old chronic compound is broken up. The carbonate of lime, &c., become acetate and muriate, and these being soluble, are taken up by the circulating system, and discharged by secretion. This fact will be seen by the gouty joints becoming less and less in bulk until they assume their natural size. During this process, the stomach and bowels should be occasionally regulated by a gentle purgative. The following is another effective remedy: Take no colchium, no mineral, nor metallic medicines; drink nothing stronger than tea or coffee; exercise in the early morning air: bathe the whole body freely; eat plain food, and plenty of it; occupy the time that does not interfere with business, &c., by study. If these rules are observed, the disease will eradicated, and life will prove that blessing which God designed it to be.

HOW TO PAINT NEW TIN ROOFS.—Scrape off the rosin as clean as possible, and sweep the roof. Wash it with strong soda water, and let it remain until a shower of rain has fallen upon it. Give it a coat of pure Venetian red, mixed with one-third boiled and two-thirds raw linseed oil; the second coat may be any color desired. The soda water dissolves the rosin remaining after scraping; and it destroys the greasy nature of the solder, and that of the new tin, so that there will be sufficient "grip" for the paint to adhere firmly. The pure Venetian red is one of the most durable paints for metallic roofs, but is often rejected on account of its color. The above mode of painting will set aside this difficulty.

OUR MOUNTAINS.—It was for a long time supposed that Mount Washinton, of the White Mountain group, was the highest peak east of the Rocky Mountains. But this honor must now be definitely conferred upon Smoky Mountain, belonging to the Black Mountain group, and situated in Jackson county, North Carolina, near the Tennessee line. Professor John Le Conte, of South Carolina College, accompanied by Mr. Clingman and Mr. Buckley, has made accurate barometric observations of the various heights composing this group, during the past summer. These gentlemen, and Professor Guyot, have ascertained that North Carolina has no less than 15 peaks higher that Mount Washington. According to Captain Cram, of the United States Coast Survey, the height of Mount Washington is 6,293 feet. The elevation of Smoky Mountain is 6,737 feet.

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HOT-AIR OVENS FOR IRON FURNACES.

[Continued from page 234.]

The description of oven now to be considered is one, the substantial advantages of which have gained for it, during the last few years, a wide reputation and increasing adoption. The arrangement is wholly due, the writer believes, to the practical genius of Mr. Martin Baldwin, who first had an oven on this plan constructed at his works at Bilston, which is commonly known as the round oven, shown in Figs. 14 and 15. Bearing in mind the various defects which developed themselves more or less in all the ovens previously described, Mr. Baldwin directed his efforts, first, to the construction of a main of such a form that its expansion or contraction should in no way tend to disturb the socket-joints of the upright pipes; second, to the construction of upright pipes that should have all the expansion they required without tending to disturb the socket-joints, or to break or burn down; third, to the construction of a form of casing which, whilst it gave a good fire-grate area, should be compact, and, as far as possible, reverberatory, so as to throw back the heat on to the pipes, and present as little surface as possible for its abstraction from the oven. In these points he succeeded to an extraordinary degree. It will be seen from the plan (Fig. 15) that the form of main designed was admirably adapted for the purposes in view, being circular or annular in plan, cast in two semi-circular portions, with a long longitudinal diaphragm through the center, dividing each portion into two compartments; on the upper side of each semi-circular portion, 24 socket-holes were cast, 12 in each compartment, making 48 total. In the middle of the outer compartment of each main, between the sixth and seventh socket-holes, a stop was cast; and at either end of the main an inlet and outlet branch was cast on, communicating with the outer compartment. The two mains being placed on a brick foundation, with fire-grates below, formed a complete circular main, ready for the insertion of the upright pipes. These consisted each of two straight pipes about 11 feet long, cast together, with spigot ends at the bottom fitting into the sockets on the main, and closed at the top, with the exception of a lateral opening to permit one side of the pipe to communicate with the other. Each pipe was four inches inside diameter, and one and a half inch thick. Twenty-four of these pipes were fixed in the sockets on the mains, and the joints well rammed with iron cement; and a circular casing of masonry, lined with fire-brick, was erected around them, and surmounted with an arched dome and stack. The cold blast, entering at the same end of each main through the inlet pipes placed side by side, traversed first the outside compartment of the main as far as the stop, and then, passing up the outer portion of the first six pipes and down the side next the fire, it arrived at the inner compartment of the mains, from which it passed up the inner sides of the next six pipes, and down their outer sides into the outer compartment of the mains beyond the stop, and thence issued through the outlet branches at the hot ends of the mains.

This oven was found to give a satisfactory heat, though not superior to that obtained with some of the other descriptions of ovens; but, in freedom from fracture or leakage of joints, it was soon found to be very greatly superior to any others. Since its first erection, eight years ago, no deviation from the principle of construction of the mains or pipes has been found necessary; the only alterations during that time having been the elongation of the legs of the main into a horse-shoe form in plan, and an increase in the diameter of the pipes, with a diminution of their weight from one tun to 16 cwt. each, by reducing the thickness of metal. Nothing could stand better than the socket-joints at the feet of the upright pipes; and the writer can state from personal experience, that out of nearly 400 of these joints which have been within his daily inspection, and some of which have been made upwards of five years, not one has ever failed or had to be re-made. The great durability of the socket-joints and heating-pipes arises from the two sockets in each pair being close together and cast in one piece, so that the distance between them is invariable and unaffected by expansion, whatever be the temperature they are exposed to; while the pipes, being cast straight, and without any points of contrary flexure, are not exposed to injury from the action of the fire, nor subjected to any strains from expansion, the whole of the expansion taking place vertically in the direction of the length of the pipe.

In consequence of its complete freedom from fracture or leakage, attempts were early made to improve the mode of setting of this round oven, so as to obtain a larger heating power from it. One of the first defects observed was the position of the stack-flue directly over the fire-grate, by which arrangement a large proportion of the column of heated flame and gases, instead of being distributed amongst and about the pipes, passed direct out at the stack without coming in contact with them. To obviate this difficulty in the next oven erected, the hole through the brick dome at the top communicating with the stack was built up, and the flues distributed round the outside casing of the oven at the top, so as to create a draught from the grate to the back of the pipes all round. This was found to be a considerable improvement, but was, to some extent, counteracted by the casing of the oven being set back 14 or 15 inches from the pipes, in order to allow of back flues being taken under the mains from the grates, that some heat might ascend at the back as well as the front of the pipes; by this means, a considerable amount of the reverberatory effect of the casing on the pipes was lost. It will be seen, also, that in the first form of round oven (shown in Figs. 14 and 15) a fire-door was placed at both the cold and hot ends of the grate. This was found to be very detrimental, especially in a high wind, as the comparatively free draught playing under the grate frequently blew the fire out at one door when blowing full in at the other, interfering seriously with the proper draught of the oven. These various defects were remedied by a further improved mode of setting, where the second fire-door is done away with, and the ash-hole blocked up at that side; the brick-work is retained, as at first, close to the pipes, with only about four inches space; and the top flues are placed round the outside of the casing, so as to distribute the heat as much as possible among the pipes, with considerable advantage in the heating power of the oven.

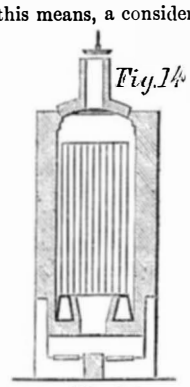

Fig. 14

Fig. 15

[To be continued.]

STILES'S IMPROVED TOE-STRETCHER.

The accompaning cuts represent an improved boot or shoe stretcher invented by N. C. Stiles of West Meriden, Conn., a patent for which has been applied for.

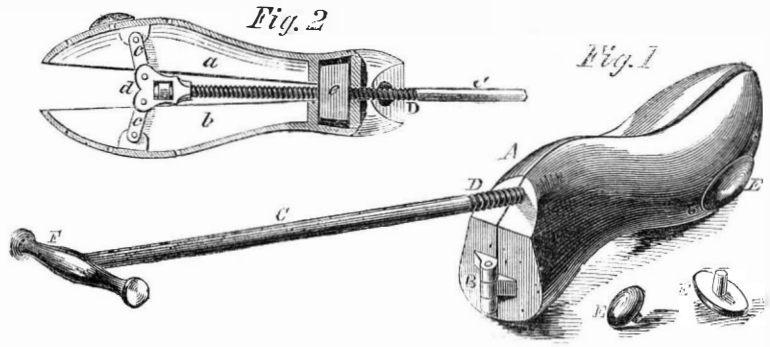

Fig. 2

Fig. 1

Fig. 1 is a perspective view of the whole apparatus, Fig. 2 represents a horizontal longitudinal section. The The two halves of the last are made of cast iron, hollow, and connected at the head by a hinge, B. Two levers, *c c*, are hinged to the side of the last near the toe, and to the iron, *d*, which is connected by a rollling joint to the screw, D. The screw, D, passes by a thread through the iron block, *e*, which is held loosely, but so that it cannot roll, by a receptacle cast in the last for the purpose. It is readly seen that as the screw is turned into the last, the levers, *c c*, crowd the two halves of the last apart at the toe, and thus stretch the boot or shoe in which the last may be placed. Local stretching may be given to different parts by inserting the large headed pins, E, E, E, into holes prepared for them near the ball and toe of the last.

Further information may he obtained in regard to this stretcher by addressing either the inventor as above, or Charles Waterman, agent, 43 John street, New York.

CURIOUS COINCIDENCE OF NATURAL LAWS.

On October 3d, in an introductory lecture to a course on geology, delivered at the Cooper Institute, Professor Boynton made the following statement in regard to a most wonderful coincidence between the law which regulates the position of leaves upon plants, and the law in accordance with which the *planets* revolve upon their axes. In some plants the leaves are arranged alternately on opposite sides of the stalk or branch. Starting from one leaf, we find the first leaf above on the opposite side of the stalk, and the second leaf above on the same side of the stalk. In going once round the stalk we find two leaves; that is we go $\frac{1}{2}$ of as many times around the stalk as we find leaves. There is another order of plants in which we find the third leaf above directly over the one from which we start; in other words, we go $\frac{1}{3}$ of as many times around the stalk as we find leaves in going round. In the next order of plants we go twice around the stalk before we find a leaf directly over the one from which we started; and in *all* plants in which the leaves are thus arranged, we find *five* leaves in the two circuits —it is the fifth leaf which is directly over the one from which we started; in other words, there are 2-5 of as many circuits as leaves. In another order of plants the leaves are so arranged that between two, one of which is directly over the other, there are three circuits of the stalk, and in all such cases it is found that there are eight leaves in the three circuits; the number of circuits is $\frac{3}{8}$ of the number of leaves. There are no plants in which one leaf is found directly above another in four turns round the stalk, but there are plants in which the leaves make five turns to come directly over the starting point, and in *all* cases there are thirteen leaves in the five circuits; the number of circuits is 5-13 of the number of leaves. There are no plants in which one leaf is found precisely over another in either six or seven turns of the stalk, but there are some in which this occurs in eight turns, and in these eight circuits there are always twenty-one leaves. Now, if we arrange these fractions,

$$\frac{1}{2} \quad \frac{1}{3} \quad \frac{2}{5} \quad \frac{3}{8} \quad \frac{5}{13} \quad \frac{8}{21}$$

in order, we find that, by adding together the first two numerators, we have the third next numerator, and by adding the first two denominators we have the third denominator; while the sum of the second and third numerators is the numerator of the fourth fraction, and the second and third denominators is the denominator of the fourth fraction; this law going through the series. Take the first two fractions, $\frac{1}{2}$ and $\frac{1}{3}$; 1 and 1 make 2, and 2 and 3 make 5, which gives us 2-5. Add in the same way the next two fractions, $\frac{1}{3}$ and 2-5, and we have $\frac{3}{8}$, 2-5 and $\frac{3}{8}$ make, by the same process, 5-13; and $\frac{3}{8}$ and 5-13 produce 8-21. Professor Boynton said that Agassiz, though not the discoverer of this law, had examined it very extensively, and pronounces it invariable; and that the leaves of all plants, from the simplest grass to the most perfect tree, are arranged in accordance with this law.

This rule is sufficiently curious in itself, but how wonderful to find that the same fractions express the number of rotations which each *planet* makes in one of its revolutions around the sun! Mr. Boynton stated that Professor Pierce, the eminent mathematician and astronomer of Cambridge, Mass., has discovered that if we take the number of rotations on its axis which the outer planet of our system, Neptune, makes during one of its revolutions about the sun, we shall find that the next planet, Uranus, makes $\frac{1}{2}$ as many during one of its revolutions; the next one, Saturn, $\frac{1}{3}$ as many, Jupiter, 2-5 as many, Mars, $\frac{3}{8}$, the Earth, 5-13, Venus, 8-21, and Mercury, 13-34. When we see the same mathematical law pervading distinct and widely-separated departments of nature, it is impossible to doubt that one mind, in accordance with one all-embracing plan, fashions the structure of the humblest weed and rolls the planets in their appointed courses.

There has been quite a decrease in the exports of boots and shoes from New York to California, and the prices, as a consequence, have become firm in that market.

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HOURS OF LABOR.

With the constantly increasing facilities of doing work, there can be no doubt that mechanics might shorten their hours of labor, if they would manage the matter properly. The way to do it is to bring the forces to bear on the supply and demand of labor in the market. When employers find it difficult to procure men at the current rates, it is easy for a skilled and active workman to obtain some advantage, either in the rate of wages or the hours of labor. But where there are many applicants at the current rates, for every vacancy that may occur, there is no use in trying to get higher wages or fewer hours.

In the summer of 1853. capital had accumulated in San Francisco, and large numbers of buildings were commenced. Gangs of stone-cutters were scattered over the city, and the click of their hammers announced the arrival of seven o'clock in the morning almost with the regularity of chronometers. There wages were $10 per day, paid to them in gold every night. In the course of the summer these intelligent mechanics became satisfied that the supply of labor was short of the demand, and they struck for $12 per day, and having been correct in their calculations, they carried their point and obtained the advance. In Germany the supply of labor has been so crowded upon the demand, that mechanics wages are only from 25 to 40 cents per day. Would the German mechanics' carry their point if they should strike for $12 per day? The price of labor, like the price of other things, adapts itself to the supply and demand, by one of those natural laws of trade which are omnipotent. The sensible plan is to conform our course to these laws and act in harmony with them. If we wish to raise the price of labor, we must either diminish the supply in the market or increase the demand. It is in the power of every mechanic to do both of these. He has simply to pass himself from the class of employed to the class of employers. This adds one to the number who are ready to hire workmen, and diminishes by one the number seeking to be hired. Of course, the only way for a manto make this transition is by becoming a capitalist; in other words, by saving his wages. Even if he continue in employment, some money laid up renders him less dependent upon his employer and has a powerful tendency to raise his wages. A man who has not the means of getting the next meal of victuals is absolutely at the mercy of the man who can give him the means. Industry and economy are the two causes which have made our mechanics (as a class) independent, and have raised their wages and shortened their hours of labor. A continuance of the practice of these cardinal virtues will accomplish further result in the same direction. A resolute patronage of the savings' bank, for five years, by the mass of our mechanics, would, no doubt, reduce the time of labor to nine hours a day; and it as certain as that the laws of God are omnipotent, that nothing but economy can acccomplish this result.

MASSACHUSETTS' TEXTILE MANUFACTURES.—Printing-cloths are in slow sale. The manufacturers are not doing much, the work on Fall styles being about over, and they are not laying in stocks to any amount for spring goods. In actual sales, manufacturers are inclined to shade a little, though the quotations remain unchanged. Stocks are not accumulating. The Providence market, which is the largest for consumption, shows a falling off in the amount of transactions, and a drooping in prices. The print market is dull, and prices rule in favor of the buyer. Many of the makes are being cleared off at considerable discount in prices previously held. In woolen goods, the manufacturers generally are doing a very profitable business. The high prices at which the raw material is held has not affected the price of manufactured goods, and for some styles the demand is far ahead of the supply. For all strictly good and desirable styles of high-priced cassimeres the demand continues good, and prices previously given are fully sustained. Purchasers of large lots are holding back in hopes of a concession; but the manufacturers are firm, with no accumulation of stock on hand. Some of the mills are worked clean up on orders. Low-priced cassimeres have been in great demand, with a very moderate supply. Some of the smaller mills have been stopped for want of water, but the recent heavy rains will remedy that evil. Silk mixtures are in good demand. Notwithstanding the introduction of cloaks and other substitutes for outside garments, the demand for shawls is on the increase. The very desirable styles produced by the Middlesex Company are in constant demand; and, though this company are producing at the rate of 2,500 per week, the supply is short.—*Boston Commercial Bulletin.*

IMPROVED BISCUIT BOARD.

SHANK'S BISCUIT BOARD.

This is a very neat and compact arrangement for keeping flour and meal and for molding bread and biscuit. It will be readily understood by a glance at the engravings.

Fig. 1 is a perspective view, and Fig. 2 a vertical section. It is simply a chest divided into two compartments, A A, by the partition, D, for two kinds of flour or meal, and having two covers, the inner one serving as a biscuit-board for molding the bread. This inner cover has two openings into the compartments of the chest which are covered by the two trap-doors, H H. The supports on which the trap-doors rest are beveled on the upper edge in order that they may not collect the flour. To facilitate the removal of the trap-doors their edges are raised by pressing on the pins, J J, by which one end of the levers, G G, is lowered, and the other is pressed up against the end of the doors.

The patent for this neat arrangement was granted to Isaac R. Shank, of Buffalo, Virginia, July 26, 1859.

DANGERS OF BALLOONING.

Notwithstanding the dangers from which Mr. La Mountain escaped in his aeriel voyage from St. Louis, in the early part of last July, he exhibited the daring rashness of making another ascent, with Mr. J. Haddock, from Watertown, N. Y., on the 22d of last month, and as before, his life and that of his companion have been saved almost by a miracle. The ascent was splendid, and after rising to an altitude of three miles the balloon drifted eastward, and when seen, as night was closing aronnd it it was moving in the direction of the New York wilderness, called "John Brown's Track." After this no tidings were heard of them for ten days, and they were nearly given up for lost when, on the 3d inst., electrical pulsations from Ottawa, Canada, conveyed the joyful intelligence to their friends in Watertown that the aerial vovagers were safe. They were swept northward during the night, uuknown to themselves, and came down three hundred miles distant in the northern wilderness of Canada. When morning dawned, the dread realities of their situation broke painfully upon them, as they were without food and proper clothing, having cast all overboard. Being in the midst of a dense forest they scarcely knew in what direction to turn in search for the abode of man. Fortunately, after a short journey, they came to a deep creek, and resolved to follow its course. Having found a scooped log, they launched it on the creek and commenced their dreary voyage through many perils, passing down through dangerous rapids, with shoes torn to pieces and garments in rags. With only a couple of frogs for food, they moved onwards, dying by inches from hunger and fatigue, for four days. At last they came to a small lake, and as they were poling their rude canoe along its shores, they heard the joyful crack of a rifle, and, looking to the opposite bank, beheld a column of smoke curling above the trees. Almost overpowered with joy, they moved as rapidly as their feeble strength would permit towards the shore, and found a camp of Indians and half-breeds in charge of Mr. Angus Cameron, a Scotchman who was exploring the region for timber. Here they were told that it was 150 miles from human dwellings, with nothing north but a dense, uninhabited forest, stretching to the Arctic Circle. They would have certainly perished had Mr. Cameron not been there at that particular juncture. This gentleman was as kind to them as a brother; he provided them with food and clothing, and carried them to the settlement of Desert, where they found Mr. Backus, an American, who treated them kindly, and brought them to Ottawa, from which place they reached home on the next day.

This aerial voyage was a most unfortunate and unsatisfactory one. The balloon and everything which La Mountain and Haddock possessed, except their lives, were lost; and yet Mr. Haddock says that La Mountain is not converted in his views about ballooning, and hopes some capitalist will furnish him means to carry on his undertakings. The best way to assist Mr. La Mountain is to hold him to *terra firma* by main force, if he ever afterwards persists in ballooning.

CALIFORNIA, HO!—The rush for California is great, at present, owing to opposition among the different steamship lines and the low fares charged. Steerage passengers, with bed and board found, are carried to San Francisco for $45. The Collins' line old steamers are now on this route and doing a good business. No less than 1,200 passengers went by the *Baltic* on Wednesday, the 5th inst., and other two steamers which sailed on the same day were also crowded.

OHIO AND WHISKY.—Cincinnati surpasses all other cities in the wide world for making *aqua vitæ*. During the past year, ending August 1st, 609,848 barrels were exported (amounting to about 20,000,000 gallons), and requiring about 7,000,000 bushels of corn—an awful amount.

KAEFER'S MODE OF TRANSMITTING MOTION.—A working model of this machine may be seen in operation at room No 26, corner of Center and White streets, this city; also one at the Fair of the American Institute.

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NOTES ON FOREIGN INVENTIONS.

Compasses without Magnets.—A new compass, having no needle or magnet, has been invented by Mr. Maillard, and applied to a steam yacht called the *Argus*, with considerable success, as we learn by the London *Engineer*. The instrument was lashed to the after-part of the paddle-box in the rudest manner, and, notwithstanding the great disturbance to which it was subjected in that position, it gave the ship's course with sufficient accuracy to establish its success. This test of its capacity was solicited by the inventor. The principle of its action is not described; but we publish this notice on account of the novelty of the experiment, and at some future time we may be able to give more particulars regarding the invention.

New Alloy.—R. Mushet, of Coleford, England, has obtained a patent for a new alloy, made as follows: He takes wolfram ore, and reduces it to a metallic condition by exposing it in a closed crucible at a white heat for 96 hours. The furnace used for its reduction is an ordinary steel converting-furnace, furnished with the usual melting-pots or crucibles for the purpose. A layer of wolfram and a layer of charcoal in powder are placed alternately one above the other in the melting-pot, and put into the furnace. Wolfram is composed of tungstic acid, protoxyd of iron and protoxyd of manganese. The alloy obtained consists of tungsten, iron and manganese. It takes a most intense heat, it seems, to reduce tungstic ore; and this may account for it never having been operated upon heretofore for the purposes of commerce and the arts. This ore occurs at Monroe and Trumbull, in Connecticut; also, in the gold regions of North Carolina.

Coating Iron with Copper and its Alloys.—A patent has been obtained by T. C. and G. I. Hinde, of England, for the purposes indicated in the title of this paragraph. The surface of the iron to be coated with the copper is first prepared by covering it with tin, zinc or lead, or any two of these metals, as a medium to make the copper or its alloy adhere. For this purpose, the iron is steeped for a short time in dilute sulphuric acid, then scoured bright, and dipped into molten tin or into molten zinc by the ordinary processs of tinning and galvanizing. It is now prepared to receive the next coat. The copper or brass is melted in a suitable crucible, and in any proper furnace, and the prepared iron is dipped into it and retained a sufficient length of time, until it is nearly of the temperature of the molten metal. The length of time which the iron must remain in the crucible depends upon the size of the pieces to be coated; a prolonged exposure will injure the article immersed. The operator must judge, by inspection, when the coating is completed; a little practice will enable him to do this with certainty. After the article is coated, and withdrawn from the vessel of molten copper or brass, it is placed in an annealing-iron pan and covered with charcoal dust or the turnings of cast-iron, then covered with a lid and placed in an annealing-oven, where it is submitted to a red heat, but not sufficiently high to melt the copper or alloy. If the copper coat, however, attains to incipient fusion in the annealing-oven, it becomes more smooth. After remaining in the annealing-oven for half an hour, the closed pan is removed, and its contents allowed to stand undisturbed until they are quite cold. Another method, and peculiar one, for shortening the annealing process, is to heat a closed pan filled with charcoal dust up to the melting point of copper, and place the coated articles at once in this for half an hour. Iron wire, coated with tin or zinc, may be covered with copper or brass by passing it rapidly through a trough containing the molten copper. The wire so coated is annealed in the manner described, and may be drawn afterwards like common hoop wire.

Tempering Steel Wire.—T. F. Cocker, of Sheffield, England, has obtained a patent for tempering steel wire by immersing it, when taken from the annealing-pot, in hot water, warm oil, or any liquid in a heated state. By the usual method of tempering steel wire, it is never dipped in a heated liquid after being annealed.

B. D. Webster and J. Horsfall, of Birmingham, have also secured a patent for a mode of treating such wire, in order to impart to it great tenacity, for the purpose of adapting it to pianofortes and wire-cables. The steel wire is first heated to redness, then suddenly cooled in water to harden it. After this, it is plunged into a bath composed of 40 pounds of lead, 12 of zinc, 26 of antimony, 21 of tin, and 1 of bismuth. This quantity of metal in the bath will answer for 100 lbs. of wire. The hardened wire is allowed to remain in this bath of molten metal until it has attained to the temperature of it, when it is to be withdrawn, and sprinkled with cold water. By the use of such a tempering-bath, the tenacity of the wire is greatly increased, so as to adapt it for the final drawing operation.

ANIMAL OXYDATION.

In the animal body the food is the fuel. With a proper supply of oxygen we obtain the heat given out during the oxydation or combustion of that fuel. In winter, when we take exercise in a cold atmosphere, and when, consequently, the amount of inspired oxygen increases, the necessity for food containing carbon and hydrogen increases in the same ratio; and by gratifying the appetite thus excited, we obtain the most efficient protection against the most piercing cold. The oxygen taken into the system is given out again in the same form both in winter and in summer. We expire more carbon at a low temperature, and require more or less carbon in our food in the same proportion; and consequently more is respired in Sweden than in Sicily; and in our own country, an eighth more in winter than in summer. Even if an equal weight of food is consumed in hot and cold climates, Infinite Wisdom has ordained that very unequal proportions of carbon shall be taken in it. The fruits used by the inhabitants of southern climes do not contain, in a fresh state, more than 12 per cent of carbon, while the blubber and train oil which feed the inhabitants of polar regions contain 66 to 80 per cent of that element. From the same cause, it is comparatively easy to be temperate in warm climates, or to bear hunger for a long time under the equator; but cold and hunger united very soon produce exhaustion. The animals of prey in the arctic regions, as every one knows, far exceed in voracity those of the torrid zone. In cold and temperate climates, the air, which incessantly strives to consume the body, urges man to laborious efforts, in order to furnish means of resistance to its action, while in the hot climates the necessity of labor to provide food is far less urgent. Our clothing is merely an equivalent for a certain amount of food. The more warmly we are clothed, the less urgent becomes the appetite for food, because the loss of heat by cooling, and consequently, the amount of heat to be supplied by the food is diminished.

According to the preceding expositions, the quantity of food is regulated by the number of respirations, by the temperature of the air, and by the amount of heat given off to the surrounding medium. The unequal loss of heat in summer and winter, in cold and hot climates, is not the only cause which renders necessary the unequal quantities of food. There are other causes which exert a very decided influence on the amount of food required. To these causes belong bodily exercise, and all kinds of bodily labor and exertion. The consumption of mechanical force in the body is always equal to a waste of matter in the body, and this must be restored in the food. When a man or an animal works, a certain amount of food must be added. Increased work and effort, without a corresponding incsease of food, cannot be continued for any length of time; the health of the man or animal soon gives way.

The first effects of starvation is the disappearance of fat. Its carbon and hydrogen have been given off through the skin and lungs, in the form or oxydized products. It is obvious that they have served to suppport respiration. In the case of a starving man, 32½ ounces of oxygen enter the system daily, and are given out in combination with a part of the body. It has been demonstrated clearly that the inhaled oxygen, in the respiratory process, makes a selection among the substances which are capable of entering into combination with it. It combines first and chiefly with those that have the greatest attraction for it. In the process of starvation, however, it is not only the fat which disappears, but also, by degrees, all such of the solids as are capable of being dissolved. In the wasted bodies of those who have suffered starvation, the muscles are shrunk and unnaturally soft, and have lost their contractilty. Towards the end, the particles of the brain begin to undergo the process of oxydation, and delirium and death close the scene.

China is the great country for raising raw silk. No less than 1,000,000 of pounds were exported last year. All classes in Pekin wear it for common clothing.

THE AMALGAMATION AND GILDING OF ALUMINUM.

[Translated expressly for the Scientific American.]

M. Tissier announces to the Academy of Sciences that he has repeated the experiments of M. Cailletel for the amalgamation of aluminum, and that he has satisfied himself of the remarkable intensity of the amalgamation at the negative pole of the battery, and that, if a sheet of metal is not too thick, it may be completely amalgamated, when it becomes extremely brittle. He says also that he has succeeded in obtaining the union of mercury and aluminum simply by the use of soda, or of caustic potash, without the aid of the galvanic battery. The aluminum, brightened and moistened with an alkaline solution, is immediately attacked by the mercury, which forms a brilliant coating on its surface.

Whatever may be the process employed, the properties of the amalgamation of aluminum are very remarkable. Under the influence of the mercury, to which it is allied, the aluminum ceases to be a precious metal, and takes the properties of an alkaline earthy metal. Exposed to the air the amalgam instantly loses its brilliancy, becomes warm, is rapidly oxydized and transformed into alumina and metallic mercury. Water decomposes it with the disengagement of hydrogen, the formation of alumina and the deposit of mercury. Nitric acid attacks it with violence. The author thought of employing this means for gilding aluminum, considering the facility of the amalgamation; but the sudden alteration of the amalgam by the air has forced him to renounce it. To gild aluminum, 8 grains of gold are dissolved in *aqua regia*; the solution is diluted with water and left to digest over night with a small excess of lime. The precipitate of aurate of lime and of lime in excess, well washed, is treated at a mild heat with a solution of 20 grains of hyposulphite of soda in a quart of water. The liquor filtered is suitable for cold gilding, without the aid of electricity; the aluminum being simply plunged into it, having been first purified by the successive action of potash, nitric acid and pure water.—*Le Genie Industriel.*

ELECTRICAL INVENTION.

"The field for inventors in electrical science has a vast area; and as past discoveries have been so easily applied to practical purposes, it is surprising that so few scientific inventors give it their attention. Electricity may be made to produce motive power, either through the medium of heat or magnetic attraction; and as it may be produced or collected and stored up by the expenditure of power alone, there is certainly a possibility, through careful observations of its laws and inventive genius, to conceive and construct devices by which it may be made self-generating, and furnish a surplus of power for other purposes."

This extract we copy from the New York *Tribune*, from a column containing a review of last week's list of patents. It will be observed by our constant readers "who know a thing or two" about science, that its author is acquainted with the "electric-shock," but is shockingly deficient in scientific knowledge. He asserts plainly that electricity may be produced or stored up by the expenditure of power alone, and that it is possible to make it not only self-generating, but also furnish a surplus of power. This is tantamount to asserting that a steel spring can be made to wind up itself, and yield more power than was applied to wind it. The author "gives the whole figure" of perpetual motion upon such basis. But the suggestion is preposterous; such a result can never be accomplished—it is opposed to the established laws of science. If electricity could be applied to produce such effects, so could wind, steam, water, and animal power; as the law and the principle are the same in all the domains of practical mechanics.

ENGLISH PATENT YEAST.—Boil six ounces of hops in three gallons of water three hours; strain it off, and let it stand 10 minutes; then add half a peck of ground malt, stir it well, and cover it over; return the hops, and put the same quantity of water to them again, boiling them the same time as before, straining it off to the first mash; stir it up, and let it remain four hours, then strain it off, and set it to work at 90°, with three pints of old yeast; let it stand about 20 hours; take the scum off the top, and strain it through a hair sieve; it will then be fit for use. One pint is sufficient to make a bushel of bread.

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THE FOUR ORGANIC ELEMENTS.

OXYGEN, HYDROGEN, NITROGEN AND CARBON.

III.—NITROGEN.

Nitrogen has fewer interesting properties than oxygen and carbon; indeed, it is remarkable for its absence of active properties, and is called the "negative element." But this very negative character fits it admirably for one great purpose to which it is put in the arrangements of nature—the dilution of the oxygen in the atmospheric air. The affinity of oxygen for many substances is so powerful that, if the atmosphere was wholly formed of it, the first fire that was kindled would probably rage with uncontrollable fury till all the oxygen had disappeared in combination with other substances. But by diluting the oxygen with about four times its bulk of nitrogen, fires are reduced to control and yet remain sufficiently active for use. This dilution also exactly adapts the air to the respiration of animals. The atmosphere is composed mainly of 77 pounds of nitrogen to 23 pounds of oxygen. Nitric acid is composed of 14 pounds of nitrogen to 40 pounds of oxygen. In the air, the two substances are mechanically mixed; in the acid, they are chemically combined.

Nitrogen enters extensively into the formation of animals and vegetables. Ammonia is composed of nitrogen and hydrogen in the proportion of 14 pounds of nitrogen to 3 pounds of hydrogen. The compounds of nitrogen are remarkable for their tendency to decompose. This substance is practically in favor of an easy law of divorce. From this tendency to decompose, if we were going to attack the problem of producing a new power to drive a light engine without a boiler, it is among the compounds of nitrogen that we should first look. Nitrogen is a component part of saltpeter or niter, and consequently of gunpowder and fireworks. It also enters into the composition of fulminating mercury or percussion powder, with which percussion caps are prepared. The explosive force of gunpowder results from its decomposition into its elements, which assume the gaseous form and are at the same time intensely heated, and thus their bulk is enormously increased, and they swell out, forcing away whatever may endeavor to restrain them.

IRON AND ITS USEFUL APPLICATIONS.

The United States has iron in unlimited abundance; and iron is, of all metals, the most important. Better be without our gold mines than our iron mines; in fact, we may almost estimate a nation's might by the quantity of iron it consumes. It enters into the composition of almost everything, and without it nothing substantial can be effected. The farmer's plowshare, the woodman's ax, the instruments of agriculture, the wheels of carriages, the shoes of horses, the multiform machinery of manufactures, and the tools of every trade—to say nothing of the railroad and the steam-engine—all these powerful auxiliaries of man are chiefly composed of iron. We have not an article of utility in the household which is not dependent in a great measure upon this metal. While iron is the source of our prosperity in peace, it forms also the very nerves and sinews of our strength in war; the cannon-balls, the sabre and the bayonet—those terrible instruments of destruction—are all composed of this same metal. Upon the sea it is equally omnipresent; there, in the shape of a steamship, it forms the vessel of war, the most formidable agent which has been yet employed by man. Thus, no subject can abound in deeper interest to all nations than that of iron; and the greater the facility with which any land can produce and employ it, the more does she possess within herself the true elements of wealth. No nation, however, should be content with the mere knowledge that nature has enriched its territory with the elements from which this metal can be produced. Her people must also be instructed in the most economical methods by which the buried treasure may be drawn from the bowels of the earth and transformed into articles subservient to the use of man. All nations, accordingly, which have made any considerable advance in civilization, have devoted a large amount of time to the study of the art of making and working iron. This most valuable metal is so abundant in the earth, and is produced so cheaply, that to compete in the production, not only the ore but the lime and fuel for working it must be had; and as these are required in so large a quantity, the three must be found in close proximity. Each tun of ore requires one tun of coal and one-third of a tun of lime. In many portions of the western States iron is found in horizontal beds with similar beds of coal and lime, all cropping out in the ravines which have been cut by the action of the water through the strata, so that all three are quarried by drifting in horizontally from the ravine. Along the shores of Lake Erie and in many portions of New England, furnaces are employed in smelting bog iron ore. It has long been known that this kind of ore increases in quantity, or grows. After all the ore was once removed from a bog, in a few years it would be found to be filled with a fresh supply. It has been ascertained that this iron is brought into the bog dissolved in water; and in some cases it is simply deposited, while in others it forms the coating or shields of microscopic animals. Though the little beings are so small as to be individually invisible to the naked eye, they exist in such innumerable multitudes that great furnaces are employed for years in melting down their shields into cast-iron.

ANOTHER IRON SHIP!

An iron ship, said to be better than any yet built, is drawing towards completion at the yard of Mr. Delamater, foot of West 13th street in this city. Her dimensions are 198 feet in length on the 12th water line, 205 on the main deck, and 220 over all; 30 feet beam, and 12½ feet hold. Her construction varies only in a few particulars from that of the iron boat described last week. Her keel is made of wrought iron, 3 × 9 inches, in lengths of 40 feet, fastened together by a vertical scarf. The stern-post rises out of the keel in a continuous piece of iron. The garboard streaks, 24 inches wide and 34 inches thick, are bent down along each side of the keel to which they are riveted. The outside plating is lapped sufficiently far to receive two rows of ¾ inch rivets. The cross keelsons are essentially the same as those in the boat described last week; they are 18 inches deep of ⅜ iron. The main longitudinal keelson differs from that in the *Alabama*, being cut in pieces and let down between the cross keelsons. The two bilge keelsons are formed of plates, 15 inches wide and ⅜ inches thick, lying horizontally on the top of the cross keelsons, and strengthened with bars of angle-iron. The bilge keelsons in the middle compartment divide into 4 boiler-box keelsons 18 × 12 inches. The engine keelsons are 5 feet deep by 30 inches wide, with 2 cross keelsons, 5 feet by 18 inches; all braced with angle-iron in the most thorough manner. The deck beams are of iron, 8 inches deep and ⅝ inches thick, three feet apart, strengthened with angle-iron, with 3 feet knees at each end. There is another row of beams 10 feet apart, of the same size, merely for bracing the ship, midway between the deck beams and the floor. Above and below these intermediate beams are two bars of 3 × 4 inches angle-iron extending the whole length of the vessel, on the inside of the ribs. As these bars, together with the main and bilge keelsons converge at the bow, they are crossed by diagonal braces of angle-iron, and on inspecting this net-work, one is almost ready to credit the statement of the London *Times*, in regard to the *Great Eastern*, that "her bow is as strong as if it was made of solid iron." The frame for hanging the propeller, consisting of main stern-post, outer post for hanging the rudder, and a portion of the keel was all forged in one piece. It is from 3 to 4 inches thick, and 9 to 11 inches wide, and cost $1,200. On the top of the deck beams, are 4 plates running the whole length of the ship, 2 water-way plates 26 inches wide along the sides, and 2 plates 12 inches wide along the sides of the hatches. All the longitudinal and cross braces are strengthened with angle iron, wherever it can be done, and they are riveted together wherever there is an opportunity.

And such is the frame of a first-class iron ship. Far simpler than a frame of wood, while it is stronger, less ponderous, and less bulky. Mr. Delamater says that this is the first iron ship built in this country exactly in accordance with the English specification, as established at Lloyd's, in order for a vessel to rank "A 1." She is being built for Messrs. Mora Bros. Navaro & Co., of this city, and is intended to run between New York and Matanzas, Cuba.

Mr. Delmater has ample room and all necessary apparatus and tools—rollers, punches, shears, furnaces, lathes, &c., and is ready to build iron vessels of any size, from a "captain's gig" to the *Great Eastern*.

A COLUMN OF INTERESTING VARIETIES.

One of the many new ideas to be tried in the great balloon scheme is the carrying of condensed hydrogen gas in tight metallic receivers, to be used in replacing the gas in the balloon when that becomes heavy by admixture with atmospheric air. This is the most sensible of all their new devices.....There has been a strike among the English bootmakers in consequence of the introduction of sewing-machines in the manufacture..... No breech-loading rifle has shown as accurate firing, at any of the public trials, as a good rifle that loads at the muzzle. The Wesson rifle, which is loaded through a false muzzle, has never yet been surpassed, if it has been equaled, in accuracy at long range.....Nothing is talked of in Paris but the armor of Mdlle. Vestvali, in the *rôle* of "Romeo." It is of aluminum, cost $3,000, and weighs only four pounds. That worn by Madame Pasta, in the same part, was of fine steel, weighed 37 pounds, and cost nearly $10,000.....A master of a sloop having lost his anchor in Long Island Sound, while dragging for it, discovered a very large bed of enormous oysters. He received $500 for disclosing the fact to some oystermen, and large numbers of vessels have sinee been engaged in gathering the oysters. The bed is said to be a mile square, and four feet deep, and worth a million of dollars.....The extent of railroad lines opened in Germany, including Prussia and Austria, up to the end of 1858, was 7,360 miles. Their cost has been $600,000,000. .....A mass of the best cannel-coal of the size of a whale contains more oil than there is in that fish.....An imperial gallon is equal to the contents of a cubical vessel measuring 6½ inches on each internal side.....Iron paper, of which 700 leaves were included in one inch of thickness, was exhibited at the Great Exhibition in London in 1851.....The great chimney-stalk of Tennant & Co.'s chemical works at Glasgow, Scotland, is 450 feet high.....Norris & Son, of Philadelphia, Pa., have built more than 1,000 locomotives for railroads.....The New York Common Council have granted to Mr. Lowe, the aeronaut, the use of Reservoir-square (lately occupied by the Crystal Palace) for the exhibition of the air-ship, *City of New York*. The process of inflation will occupy some days, during which time it is proposed to exhibit the machine for the gratification of the public. Mr. Lowe is making his preparations to start on his voyage about the middle of October.....The piles under the London bridge have been driven 500 years, and on examining them in 1845, they were found to be little decayed. They are principally elm. Old Savoy-place, in the city of London, was built 650 years ago, and the wooden piles consisting of oak, elm, beech, and chestnut, were found, upon recent examination, to be perfectly sound. Of the durability of timber in a wet state, the piles of the bridge built by the Emperor Trajan over the Danube afford a striking example. One of these piles was taken up, and found to be petrified to the depth of three-quarters of an inch; but the rest of the wood was not different from its former state, though it had been driven 1,600 years.....At the bloody battle between the Chinese and British on the 25th of June, at the mouth of the Pei-ho, the river near which Pekin, the capital of China, is situated, when the American Commodore, Tattnall, heard that Admiral Hope, the commander of the British forces, was wounded, he immediately went in his barge to make a friendly visit of sympathy to the British admiral. As his barge came alongside of the admiral's vessel, a shot struck the barge, stove the seat from which the commodore had just risen, and killed the coxswain, John Hart. The man whose life was thus sacrificed was from Jamaica, L. I., where he has left a little girl. He was a favorite of the commodore.....The barrel of the famous Enfield rifle, used in the British army, is 39 inches long, with a bore of a little more than half an inch, ·577 exactly. There are three grooves or riflings, which are only 500th of an inch in depth at the muzzle, but are deeper at the breech. The twist is half a turn in the length of the barrel. The bullet is conical, and into its lower end is fitted a conical boxwood plug, which being driven forward by the explosion, forces the lead of the bullet into the grooves, and as these diminish in depth towards the muzzle, the bullet fits the bore air-tight during its passage from the barrel.....A small steam-engine is used in steering the mammoth steamship *Great Eastern*.....At No. 12 Cedar-street, New York, there are six sewing-machines driven by steam-power.

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WOOD'S OSCILLATING-ENGINE.

Oscillating-engines seem to be coming more and more into use, especially on great steamships. The four great engines, of 14 feet stroke, which drive the paddle-wheels of the *Great Eastern*, are oscillators. If the valves of oscillators are to afford as broad a field for study and invention as the valves of reciprocating-engines have, we are at the commencement of the series. The accompanying engravings represent a valve and connections, which are claimed to be superior to any hitherto known. We give the owner's description, with his own statement of its advantages.

Fig. 1 is a side view of an engine shown as having the cover of the steam-chest taken off, and the eduction pipe taken away. Fig. 2 is a horizontal section of the cylinder, steam-chest, and valve for induction and eduction of steam, taken in a plane passing through the axis of oscillation. Fig. 3 is a transverse section of the cylinder, steam-chest, and eduction and induction valves, exhibiting also sections of the induction and eduction pipes. Fig. 4 exhibits the face of the valve. Similar letters refer to corresponding parts in the several figures.

A is the cylinder, having two solid trunnions, a' a', which work in bearings, b b', on bed-plate, K, in the usual manner. B C is the steam-chest, bolted by c c, to one side of the cylinder, and near the ends thereof, and so formed as to stride across the outside of the bearing, a', of the trunnion, b. This steam-chest is in the form of two segments of circles described from a center in line with the axis of oscillation of the cylinder, as shown in Fig. 1. In the back part, B, of the steam-chest, or that part nearest the cylinder, there are two ports, d d', leading one to each end of the cylinder.

D is the valve by which the induction and eduction of the steam is effected, said valve extending across the interior of the steam-chest and fitting to two seats, e e', in which are the ports, d d'. The valve, D, is made entirely hollow, with three arms f f' f'', two of which, f' f'', are faced to fit seat, e', and the other, f, is faced to fit the seat, e. These arms have each one port communicating with the hollow interior of the valve, the said ports corresponding in size with the ports, d d'.

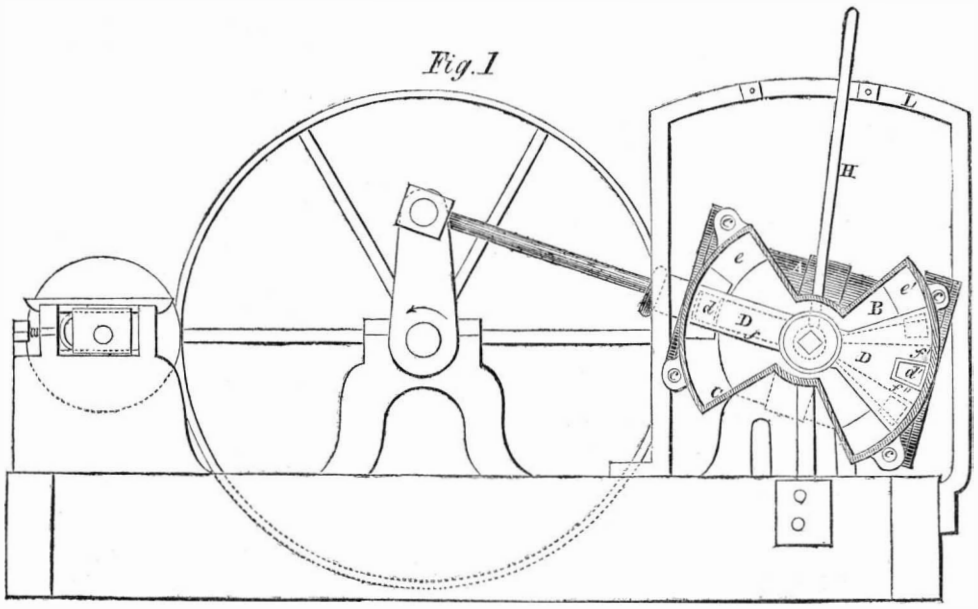
The eduction pipe, E, fits to the valve, D, opposite the trunnion, a', with a steam-tight joint, as shown at s s, Figs. 2 and 3. The eduction pipe is stationary, so also is the valve when the engine is in operation. The valve is kept in place by a stud, t, at its center, fitting to a seat or bearing in the back of the steam-chest, and prevented from turning by a square on said stud fitting to a like square in lever, H, which is locked when the engine is in operation, but can be moved to shift the valve to reverse the engine.

By having the valve, D, supported centrally by the stud, t, it is prevented from an undue bearing at its ends upon the valve seats; the stud, t, thus serves as a central fulcrum or balance point for the valve, D.

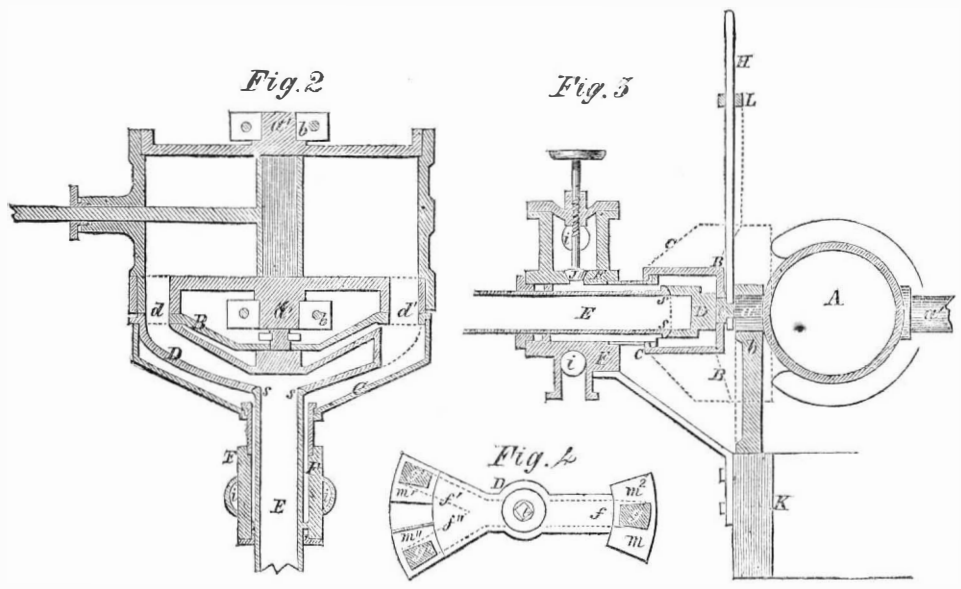
F is a stationary box surrounding the eduction pipe, for the purpose of receiving the steam from the boiler, and delivering it into the steam-chest, B C. This box is surrounded by a passage, i, with which the induction pipe connects, and between this passage and the interior of the box there is a screw stop-valve, J', which serves to shut off and, if desired, to regulate the supply of steam.

The operation is as follows:—The oscillation of the cylinder uncovers the ports, d d', alternately, and allows steam to enter from the steam-chest, and as one of the said ports is uncovered, the opposite one is brought into communication with one of the ports in the valve, to allow the steam to exhaust through the valve. In Fig. 1 the port, d', is uncovered, while the port, d, is in full communication with the port of arm, f, consequently the crank is rotating in the direction of the arrow, and the piston at "half stroke." As the motion continues the port, d', passes under the part, m', of the face of the arm, f', of the valve, and is thereby gradually closed, both ports being closed by the time the engine arrives at its center. As the engine passes the center, the port, d', moves upward under the port, g', and commences exhausting, while the port, d, moves downwards from under the part, m, of the face of the arm, f, and commences taking steam; the port, d, being fully open, and the port, d', being in full communication with the port, g', when the engine arrives at the middle of the stroke, after which the port, d, moves up under the part, m, of the valve and commences closing, and the port, d', moves down under the part, m', so that ports are again closed at the end of the stroke, but after the engine again passes the center, the port, d', again commences opening, and the port, d, commences to make communication with the exhaust port, g.

It will be understood that, during the above-described operation, the arm, f'', of the valve, and the face, $m2$, of the arm, f, are of no use, but if the valve is turned by means of lever, H, a distance equal to twice the width of the ports, d d', taken in a circumferential direction, the arm, f', of the valve is thrown out of operation, while f'', is thrown into operation, and the port, g'', and face, m'', of the arm, f'', are caused to operate relatively to the port, d', as the port, g', and face, m', previously did; and the face, m_2, of the arm, f, to operate relatively to the port, d, as the face, m, previously did; and the port, g, to operate just the reverse, by which means the direction of the engine is changed. Lever H is secured in either position by springing into notches in stand, L.



WOOD'S OSCILLATING STEAM-ENGINE.



When a reversible engine is not desired, the cost may be reduced by making the valve with two arms only. In this case, also, the eduction pipe, E, and valve, D, may be cast together, as they never require any motion.

The advantages of this engine are numerous, as any engineer will at once perceive when he fully comprehends the principles upon which it is contructed. Among these are cheapness, simplicity, compactness, durability, economy in running, non-liability to get out of order, extreme ease of management, and the facility with which it can be instantly reversed under a full head of steam.

The patent was issued January 5, 1858, to Adam Wood, and assigned to Alfred Jeffery, of Pittsburg, Pa., who will be happy to furnish further information if addressed at Arsenal P. O., Alleghany county, Pa.

NEW MODE OF MAKING CIGAR-WRAPPERS.—Cigars are made by rolling together a bundle of pieces of tobacco, and then wrapping round this roll a piece of tobacco-leaf. The wrappers are cut of the proper form, which is somewhat in the shape of a kidney, from each side of the leaf, in such a manner as that the small stems of the leaf may be parallel with the length of the wrapper, in order to give it the greatest possible strength. It is manifest that only perfect portions of the leaf can be used for wrappers. Francis Dixon, of Lynn, Mass., has recently patented a process by which he claims that a superior article of cigar-wrapper may be made with great economy and advantage. He takes ordinary leaf tobacco, such as is sold in the market, and converts it first into pulp and then into thin sheets, by the same processes and the same machinery by which paper is made from rags. He is thus enabled to use pieces of leaf of any size, even the small broken fragments, for making the most expensive portion of the cigar.

BARK OF THE LINDEN—SUBSTITUTE FOR GUTTA PERCHA.—According to Dr. Kirr, when the bark of the linden is boiled for some time in water, it becomes soft, supple, and susceptible of taking all kinds of forms, which it preserves on becoming hard by cooling. This property it preserves after having been used, so that it can be used again for different purposes; according to this, the bark of the linden may be to a certain extent substituted for gutta percha.—*Annales Med. de la Flandra Occident.*

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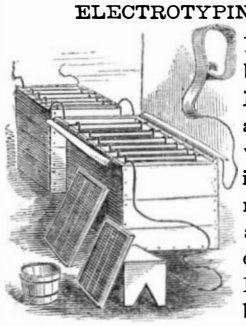
VOL. I., No. 16.....[NEW SERIES.].....*Fifteenth Year.*

NEW YORK, SATURDAY, OCTOBER 15, 1859.

ELECTROTYPING OUR PAPER.



PRINTING is one of the noblest and most useful arts. Next to the gift of speaking and the accomplishment of writing, it is by far the most important manner of communication between men, and is the great agent of modern civilization and progress. It is divided into two distinct branches, namely, the arranging of the types into words, sentences and specific forms; and the mechanism by which impressions of the types are made upon paper. The whole art of printing is founded upon the two primary and separate arts of press and type manufacturing, and each of these is divided into several branches. Our object is not to give a repetition of the old processes, which are set forth in several works on printing, but—by request of several subscribers—to explain briefly the art of electrotyping, by which the "forms" of the SCIENTIFIC AMERICAN are duplicated from common type into copper plates, from which our thousands of copies are printed weekly.

Printing-types are cast in separate letters, and these are arranged by the compositors in words, spaces, lines, columns and pages, and firmly wedged in an iron frame, called a "chase" resembling that of a writing-slate, When a moderate number of copies are to be printed, the forms of type are at once put into a press and the impressions taken direct; but when a great many copies are required, this is not done, because the type-metal, being very soft, would be worn out before the whole could be taken. For printing many thousands of copies, therefore, the original type-forms made up by the compositors are not printed from at all; they are duplicated by one of the two methods called stereotyping and electrotyping—the latter being the process or art by which the forms of the SCIENTIFIC AMERICAN are reproduced, and kept intact for future editions if required.

The moveable type having been set up from manuscript, and arranged into forms in the usual way, is taken to the rooms of the electrotyper, who first examines them to see that all are right for future operations. He now takes a form, which may embrace one two or more pages, and brushes some plumbago over the face of the type; when it is ready for the molding operation. A thin brass pan having a raised rim around it, is now filled with melted wax, and before it gets quite cool its surface is also brushed over with plumbago. The type in form is placed upon the platten of a powerful hydraulic press, and the pan containing the wax is laid upon it, face downwards, so that the type will be pressed into the plastic substance, as in die-sinking, and thus form an indented mold. The form and the pan of wax are now adjusted, and the pump set in operation to impart a gradual and perfectly square pressure amounting to no less than 1,000 pounds on the square inch, in some cases, such as for wood-cuts. When this is effected, the pressure is removed, and the type and wax pan separated. The wax now exhibits hollow places for the projecting surface of the type, and *vice versa*, and it forms the mold for the electrotype. The moveable type may now be taken back to the compositors to be distributed and set up for the next number of the paper. The brass pan with the mold is now coated with wax on all the places where the copper is not to be deposited; and is again brushed over, on all the places where it *is* to be deposited, with black lead of the best quality obtained from the Tudor mine, at Concord, Mass. The wax being a non-conductor of electricity, and the plumbago a conductor, of course, the electrotype is only formed on the latter. To prevent particles of air from adhering to the surface of the plumbago, it is moistened with water, then placed in a solution of sulphate of copper (blue vitriol) and fine iron filings are sifted over the face of the mold; these form innumerable minute batteries, which at once deposite a light scale of copper uniformly over the entire face of the mold, and upon the black lead. When this is done, the mold is washed with water, placed into a trough containing the sulphate of copper, and connected with the zinc pole of an Adams' battery. The common practice is to place the molds in the precipitating-trough in the evening, and take them out next morning, when a thin shell of pure copper—an exact copy of the movable type, wood-cuts and figures—is found deposited on the black lead surface of the wax. This shell of copper is now separated from the brass pan, and the wax removed; then is it tinned on the back, and filled up with molten type-metal, which is planed and adjusted to form a solid block with a copper face. It is now taken to the press-room and all our copies are printed from it.

We have thus given an outline description of the art of electrotyping, as at present practiced. The discovery of depositing metals from solution on molds by electricity was made in Russia and England simultaneously about 1833. It was one of the greatest inventions produced, and as applied to the duplication of type-forms, it is one of the greatest boons ever conferred upon the art of printing. None but papers which have a large circulation are electrotyped; there are only six weeklies in New York which have their forms thus duplicated, and among this small number is the SCIENTIFIC AMERICAN, which is electrotyped by William Filmer, of this city, who has been connected with the art nearly since it was first practiced in our country, has made many improvements in it, and is the author of a very able treatise on the subject. We have been given to understand that this application of electro-metallurgy to the art of printing was first made in America; and that the first electrotype of a wood-cut was made by J. A. Adams, of this city, in 1841; but it was first regularly practiced as a business in Boston, from which it was introduced into New York. For large forms it is superior to stereotyping, and is fast superseding it.

DO WE KNOW HOW MAGNETISM IS PRODUCED.

When a savage has been sick, and some particular medicine has cured him, if he sees another savage sick he thinks that the same medicine will cure *him*; but by further observation he is taught that the medicine will cure only fever, and by further observation still, that it will cure only one kind of fever; yet larger experience shows him that it will not always cure even the one kind of fever. As man advances from the savage state, and by means of records the observations of many are combined, with this enlargement of experience there is a steady growth of caution in drawing general conclusions. This gradation is seen, not merely in the advance from the savage to the civilized state, but it ascends through all ranks of medical writers till it culminates in the most eminent. No other man who has ever lived has made so extensive investigations, in regard to the effect of curative agencies, as Louis, the great French observer, and the peculiarity of his mind, with which the reader of his writings is impressed, is the extreme caution with which he comes to general conclusions. His works will well repay the study of even non-professional men, merely as lessons in the art of investigation. In his treatise on phthisis he administers a rebuke to one of his illustrious colleagues for the facility with which he came to a conclusion, which, to the larger experience, and consequently more cautious mind of Louis, seemed unwarranted by the facts.

This caution in generalization is the result of large experience in every branch of investigation, and is exhibited by the eminent observers in every department of science. It pervades Humboldt's "Cosmos," and Herschel's treatise on astronomy. It impels Lardner to refuse to recognize the wave theory of light as an established truth, and is strikingly exhibited by the great writers on chemistry in their treatment of the atomic theory. No single fact in nature militates against the truth of this theory, and many hundreds of facts tend directly to confirm it; but it is yet rejected by the stern logic of science from the domain of ascertained fact, and is consigned to the broad realm of unproved hypotheses. The distinction between the proved and the unproved, the known and the unknown, was drawn in the transparent mind of Newton with as clear a line of demarcation as that which separates the land from the water on the sea-shore. In his memorable figure he described himself as picking up a few pebbles of truth, while the broad ocean of unexplored nature spread illimitable around him on every side. Boldness of generalization is no evidence of genius. All men who have achieved greatness in science have been remarkable for the energy with which they devoted themselves to the accumulation of careful and thorough observations, and the sternness with which they rejected all inferences except those which followed inevitably and irresistibly from the facts. When they have secured an inference which did thus follow, they have laid it up in the store-house of knowledge as a positive possession. They have drawn the line distinctly between fact and theory. On one side are the established truths of nature, which no reasoning can alter and no power can obliterate; on the other, floating in the obscurity of the unknown, are the reveries of men's minds—"such stuff as dreams are made of."

We published recently a communication from a learned correspondent, giving some ideas of Dr. Winslow, of Boston, in regard to the aurora borealis, magnetism, &c, It seems to us that Dr. W. fails to draw the distinction between his facts and his theories with that clearness which now generally characterizes men of science. That there is a connection between the northern lights and the forces of electricity and magnetism is now fully established. It has been noticed so many times by different observers that there can be no doubt of its existence. But when Dr. W. affirms that magnetism is produced by the varying intensity of the forces of the molecules which constitute the mass of the earth, we ask, Is this the one irresistible inference from the facts, or would it be easy to concoct a hundred theories all equally in accordance with all observed phenomena? One tendency of the Baconian philosophy is to induce men, as they stand upon the shore that divides the known from the unknown, to direct their attention principally to those things which are within the scope of distinct vision. We say it with a respect which is not affected, but it seems to us that a man who, in the present state of human knowledge, attempts to say how magnetism is produced, has got very far at sea.

THE STATE FAIR.

[Correspondence of the Scientific American.]

From a scientific point of view the nineteenth annual fair of the N. Y. State Agricultural Society, now being held in this city, excels any former exhibition ever given in the State. The mechanical entries are more numerous and include several valuable inventions of recent date, and show an increase of interest felt by the agricultural element of the commonwealth in scientific matters. The entries, as a whole exceed by over 200 those of 1858, and the total, 2,985. The influx of visitors during the past three days is estimated by competent judges to be over 25,000, and this includes many from distant States. The number of tickets sold by the society amounts to about 23,000 up to this noon, but it is fair to suppose that not less than 100,000 persons will have visited the show, before its close. Among the distinguished visitors I noticed His Excellency Governor Morgan, and family, the Hon. John A. King, Ex-senator Dickinson, and many others.

The fine grounds set apart for the fair consist of 27½ acres, lying on the westerly side of the well-known Macadam road leading to Troy. The inclosure is filled with rare and valuable stock and with specimens of manufacture which show how rapid is the progress of art and science in the Empire State, and I may safely pronounce the fair of 1859 an entire and gratifying success. The accommodations for exhibitors are far more liberal than those of any fair held for a number of years, and the chief managers, Messrs. Patrick, Ireland and Hurst, are worthy of especial mention for their indefatigable exertions and success.

In the mechanical department, under the escort of the superintendent, Anson Atwood, Esq., I saw a very full and interesting exhibition of valuable agricultural and horticultural implements. The finest entries are made by the Messrs. Pease & Eggleston, of Albany. Several

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fine bells of delightful tone, from the manufactory of Meneely & Sons, Troy, N. Y., attracted my attention, one of which has since been placed on another section of the grounds and is connected with the telegraph to sound the fire-districts upon the alarm being given. Fawkes' celebrated steam-plow is the center of attraction in this department. Its fame has won for its inventor a numerous support from the fact that it recently carried off a $1,500 prize and several gold and silver medals. It has been put to a severe test and pronounced thoroughly practical. Ericsson's caloric engines on exhibition have excited some considerable interest among a crowd of gentlemen.

I cannot refrain from making mention of the grand display of photographs by Harvey Wendell, of Albany, also a number of fine engravings of public buildings, portraits, &c., from photographs on boxwood made by himself by Boyles' patent process. They appear to be a triumph over the slow process of drawing on wood, and may eventually supersede that system.

Last evening, Governor Morgan entertained the gentlemen of the press and a few friends at the executive mansion on State-street. The governor's hospitality is proverbial. T. T. E.

Albany, October 6, 1859.

FAIR OF THE AMERICAN INSTITUTE.

The Thirty-first Annual Fair of the American Institute continues, and is proving very successful, much more so than was anticipated. The accommodations are of course inferior to those of the Crystal Palace, but the location is more convenient for visitors, as is shown by the heavy receipts at the door. We continue our notices of the more interesting articles.

STEAM-ENGINES.

There is an unusual number of small portable steam-engines on exhibition. We observed, especially, one made by the Fishkill Landing Machine Company, designed expressly for the southern market. The cylinder and crank are directly over the middle of the boiler, and the shaft carries the balance wheels, one at each end, of different sizes, which facilitates communication with various machines. The boiler is of the locomotive pattern, having 26 3-inch tubes, made thus large to adapt them to the burning of pine wood. The whole is supported on small wheels and requires no brickwork setting, but is ready for use by simply supplying the boiler and kindling a fire. The agents are L. W. Turrell & Co., No. 215 Center-street, New York.

There is another engine of a pattern very similar to the above, made by J. C. Hoadley, Lawrence, Mass. In this the cylinder, as well as the supports of the crank-shaft, are bolted directly to the boiler, and there does not seem to be a pound of superfluous iron or a dollar of unnecessary expense used in its construction. By a very compact arrangement (a pipe lying along the side of the boiler) the exhaust steam is used to heat the water before it enters the boiler. We have never seen a portable engine in which the parts were better arranged.

CALORIC ENGINE.

Mr. Ericsson has one one of his caloric engines on exhibition, such as was fully described and illustrated on page 268, Vol. XIII., of the SCIENTIFIC AMERICAN. Where very little power is required, these engines have the advantage of dispensing with an engineer. The one at the fair is rather noisy, and attracts much attention.

FAWKES' STEAM PLOW.

In a yard adjoining the fair is the engine part of Fawkes' steam plow, the plows being detached, as there is neither sufficient room nor suitable ground to exhibit them. Announcement was made that the plow would be displayed, and when the visitors had passed into the yard where the huge locomotive was standing, the inventor mounted to his place and began to run the machine about, starting, stopping and turning it with surprising facility, and showing that it was under the most perfect command.

STEAM GOVERNOR.

Charles T. Porter, of this city, has an assortment of his steam governors on exhibition, the same as was described and illustrated on page 36, Vol. XIV., of the SCIENTIFIC AMERICAN. These are worthy of the attention of those who build or use steam-engines.

CAR BRAKE.

A car brake, invented by Wm. E. Cooper, of Dunkirk, N. Y., is so arranged as to use the momentum of the cars as a power for applying the brakes. A pinion on the axle of the cars gears into a wheel, which may be connected at will with a second wheel by means of a friction clutch. The second wheel turns a shaft around which a chain is wound when the shaft is turned, the other end of the chain being attached to a lever in such a manner as to press the brakes against the wheels. When the friction clutch is released from its hold on the constantly-turning geared wheel, the chain unwinds from the shaft and the wheels are relieved from the pressure of the brakes. As very little power is required to throw the friction clutch into action, one brakesman is amply sufficient for a train.

MAKING GAS FROM WOOD.

Mr. Werner has on exhibition, in full operation, a complete gas-work for making illuminating gas from wood. He places his wood in a light retort over a furnace and roasts it two hours, driving off the hydrogen and other volatile substances. These are passed through a series of pipes which are in contact with cold water, and which thus condense the tar and pyroligneous acid at one operation. The gas is then passed through successive layers of dry lime to remove the carbonic acid. The apparatus is simple and compact, and the inventor says that he can make gas without any expense whatever, that the charcoal produced is worth more than the wood, and that the pyroligneous acid and tar will sell for enough to pay all the other expenses.

BLIND SLAT TENONING-MACHINE.

S. C. Ellis, of Albany, N. Y., has in operation a machine for cutting and forming the round tenons at the end of slats for window blinds. It consists of circular saws, one set sliding along the frame so as to vary at will the length of the slat. The operator places a slat on the machine and rolls it over, and during the revolution the tenons are formed at both ends and cut off with an accuracy and uniformity only to be produced by machinery. Cutting off 12,000 slats and forming the tenons upon them is said to be an easy day's work. We shall probably soon give an illustration of this beautiful little machine.

SELF-LIGHTING FIRE-KINDLERS.

Mrs. Laurence Bellinger, of Mohawk, Herkimer county, N. Y., inventor and manufacturer, has on exhibition some of her self-lighting fire-kindlers. These consist of sawdust and other combustible substances formed into a cake, on one end of which is a drop of friction match paste, so that the fire may be lighted by rubbing the paste without the use of any other match.

WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page.

SEWING-MACHINE.

Kasimir Vogel, of Chelsea, Mass., has some valuable improvements in the sewing-machine, by which he is enabled to work button-holes, and to make a great variety of ornamental stitches for embroidering and ornamental work. The most important feature of the invention is, perhaps, the contrivance for working button-holes, consisting of two needles working like the ordinary sewing-machine needle, side by side, a third needle working below, and a conducting finger for interlacing the threads of the two first-named needles above the cloth, Three threads are used in making the button-hole stitch, viz., one by each needle, and though the common button-hole stitch as made by hand is made by a single thread, this machine makes a button-hole whose appearance is more like those worked by hand than any we have previously seen worked by machinery. Another valuable improvement, the movable needle-plate, to provide needle-holes suitable for needles of various sizes, will be understood by reading the second claim.

IMPROVED MODE OF HANGING SAWS.

The object of this invention is to bring the saw in such a manner that the same will be evenly strained, that is to say, be subjected to nearly an equal tension, throughout its whole width, and at the same time admit of being more or less inclined so as to leave the desired "rake," and also admit of being adjusted forward as it is worn by gumming or sharpening. This improvement was designed by Pearson Crosby, of New York City.

IMPROVED METAL-PUNCHING MACHINE.

This invention consists in having a series of punches and bolsters or shears, either or both so attached to a single rotating head, that either of a series of punches or shears that may be required, may be readily adjusted for use. The invention also consists in a novel way of operating the punches or shears, whereby any false or casual movement or stroke of the latter is avoided, and the cutters or punches as well as the work prevented from being injured thereby. The inventor of this device is Philip Koch, of New Haven, Conn.

HOW TO OBTAIN LETTERS PATENT.

A little pamphlet of 16 pages, containing hints to inventors on the best mode of obtaining patents, is furnished gratis upon application by mail or in person at our publication office, 37 Park-row.

In the list of claims, on another page, may be found the names of *fifteen* inventors whose cases have been rejected at the Patent Office, but afterwards prosecuted to a successful issue by the assiduous attention which these cases have received at our hands. Inventors who have been unsuccessful in prosecuting their cases before the Patent Office, and who have good inventions worthy of attention, are invited to correspond with us in relation to their further prosecution before the Patent Office, by appeal or otherwise.

The issuing of fifteen patents in a single week, on applications which have been rejected by the Patent Office, is, we think, sufficient evidence of the skill we possess in prosecuting rejected csaes. We would not be understood as having facilities for securing patents for inventions in which there is no novelty. Inventors who employ us to attend to the examination of their rejected claims are always advised of the probable chance that exists for a patent by continued effort; and, in all cases where it is evident that there is no novelty upon which to found a claim, the applicant is advised to withdraw, and receive back from the Patent Office the $20 refunded in such cases, and thus avoid expense. The claims of inventors are often rejected in consequence of the bungling manner in which the papers are prepared, and for other causes not necessary to specify. Our agency offers to all such an opportunity to have their rejected cases carefully attended to, and upon terms within the reach of all; and we shall be happy to correspond with all who may have any kind of business to do with the Patent Office. Address

MUNN & Co., 37 Park-row, New York.

INVENTORS who apply for patents should be cautious not to confer upon their agents by power-of-attorney, the right to withdraw the $20 in case the application should be rejected. Honorable agents do not care to receive this particular power, unless there is some express consideration beforehand whereby they should be clothed with it. Our reasons for this caution is that rejected cases are frequently coming into our hands for examination, and upon proceding to discharge the duty, we find that the agent, by virtue of the power-of-attorney, unwittingly signed by the inventor when he executed the papers, has withdrawn the application and received back the $20. This leaves the unadvised inventor no other alternative but, either to abandon his claim, or incur the expense of a new application.

CORAL FORMATIONS.—Several theories of coral formations have been propounded at different times by scientific men. The one most generally received supposes these stupendous piles to have been reared, according to one uniform law, by minute marine animalculæ, which separate the calcareous particles from the sea, and therewith build up these wonderful structures. At the commencement of their formation, the corals are attached to the land like a fringe at or near the surface of the sea; in those instances where the reef is at a distance from the land, the land has subsided; and as the land has gradually sunk, the corals have built up the reef to the surface.

ERRATUM.—In describing the fishing-reel in our last number the types made the inventor to be Wm. Rillinghurst. It should read William Billinghurst, and parties desiring further information will please to address the latter.

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FOREIGN SUMMARY—METALS AND MARKETS.

The coroner's jury in Portland, England, in the case of those who were killed by the explosion on the *Great Eastern*, gave a verdict which amounts to saying "nobody was to blame." It seems to have been proved very conclusively that a tap, which was in the safety valve stand-pipe, had been closed when it should have been open; but there was such a mixed-up command on board, among the engineers, that each shifted the blame from himself as being an irresponsible party. It will be some weeks before this vessel can be thoroughly put in order for a sea-voyage, as the engines do not operate so well as had been represented by the common reporters of the London papers.

The builder's strike in London has not yet quite terminated, which is much to be regretted as it has caused great misery among the operatives. The public are somewhat ignorant of the nature of this subject. The opinion seems to have become prevalent, that the operatives generally struck for nine hours per day, and that the employers simply resisted this demand. The case is somewhat different; the employers shut their shops against the operatives, unless they would agree to renounce connection with their Trade Union. Strikes, whether caused by workmen or their employers, are very unpolitic movements; they always cause great loss to the community in which they take place. In 1854 a strike took place at Preston, England, which lasted for 36 weeks and entailed a loss to the town of about $2,500,000.

A new traction Boydell engine for common roads has just been built for the British government, and is destined for Bombay. Its cost was $6,000; it is capable of drawing 50 tuns, and moves at the rate of five miles per hour.

The British Association for the Advancement of Science commenced its annual session at Aberdeen, Scotland, on the 13th of Sept.; Prince Albert in the chair as president-elect. The attendance was very large; distinguished men being present from all parts of Europe. In the mechanical section a paper was read by Professor Macquorn giving an abstract of a set of experiments conducted by Robert Napier & Son, the great engineers of Glasgow, to test the strength of iron and steel bars and plates. The following are tables giving the results of their experiments with loads applied gradually.

TABLE A—IRON BARS.

Districts.	Tenacity in lbs. per sq. in.
Yorkshire, strongest	62,836
" weakest	60,075
" forged	66,392
Staffordshire, strongest	62,231
" weakest	56,715
West of Scotland, strong'st	64,795
" weakest	63,655
Sweden, strongest	48,232
" weakest	47,855
Russia, strongest	56,805
" weakest	43,564

TABLE B—IRON PLATES.

Yorkshire, str'st lengthwise	56,005
" weakest "	52,000

TABLE B—IRON PLATES.

Districts.	Tenacity in lbs. per sq. in.
Yorkshire, str'gst crosswise	50,515
" weakest "	46,221

TABLE C—STEEL BARS.

Steel for tools, rivets, &c., strongest	132,909
" weakest	101,151
Steel for other purposes, strongest	92,015
" weakest	71,486

TABLE D—STEEL PLATES.

Strongest lengthwise	94,289
Weakest lengthwise	75,594
Strongest crosswise	96,308
Weakest crosswise	69,082

NOTE.—The strongest lengthwise is the weakest crosswise, and vice versa.

If some responsible parties would undertake a like series of experiment with American irons and report the results, it would be of immense benefit to our engineers and others. We have very diversified qualities of irons and have no reliable tables regarding their relative strength. In making calculations on boiler-plates, and bars, there is therefore considerable guesswork. Our malleable iron is generally set down at the tenacity of 56,000 pounds to the inch, or between 6,000 and 8,000 pounds less than the English and Scotch, whereas it is held by many to be much stronger, but how much none can tell.

We omit our usual tables of the prices of foreign metals this week, because the change in the prices is so limited. Spelter has advanced £1 per tun; and Banca tin in the same ratio. These are the only changes from those in the tables given two weeks ago.

New York Markets.

COAL.—Anthracite, $4.50.

COPPER.—Lake Superior ingots at 23c. per lb. for cash; new sheathing, 26c.

COTTON.—Ordinary—Uplands, 9c. per lb.; Florida, 9c.; Mobile, 9c.; New Orleans and Texas, 9¼c. Middling—Uplands and Florida, 11c.; Mobile, 11⅜c.; N. O. and Texas, 12c. Middling fair—Uplands and Florida, 12⅛c.; Mobile, N. O. and Texas, 13c. Fair—Uplands and Florida, 12⅜c.; Mobile, 13⅛c.; N. O. and Texas, 14c.

FLOUR.—State, superfine brands, $4.40 a $4.50; Superfine Western, $4.40 a $4.60; Extra Illinois, Indiana and Michigan, $4.85 a $6.35; Extra Ohio, $5.65 a $6.75; Extra Genesee, $5.50 a $7.25; Inferior to Choice Missouri, $5.25 a $8.50; Extra Kentucky and Tennessee, $5.30 a $9.

HEMP.—American undressed, $140 a $150; dressed from $190 a $210. Jute, $95 a $90. Italian, $2.75. Russian clean, $210 a $215 Manilla 6¼c. per lb.

INDIA-RUBBER.—Para, fine, 56c. a 60c. per lb.; East India, 40c. a 43c.

INDIGO.—Bengal, $1 a $1.50 per lb.; Manilla, good to prime, 55c. a $1.10; Guatemala, $1 a $1.15.

IRON.—Anthracite pig, $23 a $24 per tun; Scotch, $22.50 to $23; Swedish bar, ordinary sizes, $87.50 a $90; English refined, $53 a $54; English common, $43 a $45; Russian sheet, first quality, 11c. a 12c. per lb.; English, single, double and treble, 3½c. a 3⅞c.

LEAD.—Galena, $5.75 per 100 lbs.; German and English refined, $5.70; bar, sheet and pipe, from 6c. to 6¼c.

LEATHER.—Oak slaughter, light, 32c. a 34c. per lb.; Oak, medium, 33c. a 35c.; Oak, heavy, 30c. a 33c.; Hemlock, slaughter, light, 23c. a 23½c.; Hemlock, medium, 23c. a 24c.; Hemlock, heavy, 22½c. a 23c. Upper Leather.—Rough, oak, light, 31c. a 33c.; Oak, heavy, 30c. a 31c.; Oak, Southern tan, 30c. a 31c.; rough Hemlock, good light, 26c. a 27½c.; Hemlock, good heavy, 24c. a 26c.; Hemlock, polished, 14c. a 15c.; Hemlock, buff, 15c. a 18c. Cordovan, 50c. a 60c. Morocco, per dozen, $18 to $20. Patent enameled, 16c. a 17c. per foot, light. Sheep, morocco finish, $7.50 a $8.50 per dozen. Calf-skins, oak, 57c. a 60c.; Hemlock, 56c. a 60c.; Belting, oak, 32c. a 34c.; Hemlock, 28c. a 31c.

LUMBER.—Timber, white pine, per M feet, $17.50; Timber, yellow pine, $35 a $36; Timber, oak, $18 a $38; Timber, eastern pine and spruce, $16; White Pine, select, $25 a $30; White Pine, box, $14 a $18; White Pine, flooring, 1¼ inch, dressed, tongued and grooved, $24.50 a $25; Yellow Pine, flooring, 1¼ inch, dressed, tongued and grooved, $29 a 32; White Pine, Albany boards, dressed, tongued and grooved, $20 a $21; Black Walnut, good, $45; Cherry, good, $45; White Wood, cherry plank, $42; Spruce Flooring, 1¼ inch, dressed, tongued and grooved, each, 22c.a24c.; Spruce Boards, 15c. a 17c.; Hemlock Boards, 12½c. a 14c.; Hemlock Joist, 3 by 4 inch, 12½c. a 14c.; Shingles, cedar, per M. $28 a $35; Shingles, cypress, $12 a $25; Staves, W. O. pipe, light, $55 a $58; Staves, white oak, pipe, heavy, $75 a $80; Staves, white oak, bbl. culls, $20; Heading, white oak, hhds., $65. Mahogany—Duty, 8 per cent. ad. val.—St. Domingo, fine crotches, per foot, 35c. a 45c.; St. Domingo, ordinary do., 20c. a 25c.; Port-au-Platt, fine, 18c. a 20c.; Honduras, fine, 12½c. a 15c.

NAILS.—Cut at 3c. a 3⅜c. per lb. American clinch sell in lots, as wanted, at 5c. a 6c.; wrought foreign, 3¾c. a 3½c.; American horse-shoe, 14½c.

OILS.—Linseed, city made, 58c. per gallon; whale, bleached spring, 53c. a 55c.; sperm, crude, $1.25 a $1.28; sperm, unbleached spring, $1.35; lard oil, No. 1 winter, 87c, a 92c.; extra refined rosin, 30c. a 40c.; machinery, 50c. a 100c.; camphene, 45c. a 47c.; coal, refined, from $1.12 a $1.50; olive, $1 a $1.05.

RESIN.—Common, $1.60 per 310 lbs. bbl.; No. 2, &c., $1.70 a $2; No. 1, per 280 lbs. bbl., $2.25 a $3; white, $3.25 a $4.50; pale, $5.50.

SPELTER plates, 5⅛c. a 5¼c. per lb.

STEEL.—English cast, 14c. a 16c. per lb.; German, 7c. a 10c.; American spring, 5c. a 5½c.; American blister, 4½c. a 5½c.

TALLOW.—American prime, 10⅝c. to 10¾c. per lb.

TIN.—Banca, 32½c. a 33c.; Straits, 30½c.; plates, $7.50 a $9.25 per box.

TURPENTINE.—Crude, $3.62½ per 280 lbs.; spirits, turpentine, 46c. per gallon.

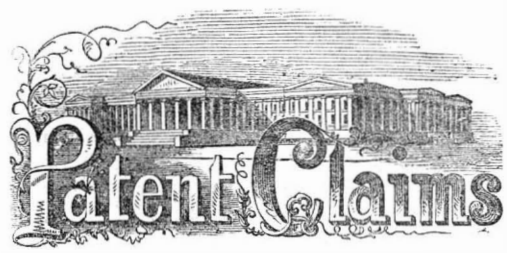
ZINC.—Sheets, 7½c. a 7½c. per lb.

The foregoing rates indicate the state of the New York markets up to October 5th.

The leather market is somewhat dull. Cotton has also been inactive, with a slight reduction in price. Three hundred tuns of Sidney coal, for gas, have arrived, at $5 per tun; and 171 of Liverpool, at $8.50. There is a good demand for foreign cannel coal. We have been informed that the price of cannel coal in London is 30 shillings sterling (or over $7) per tun. The duty upon it is 24 per cent. *ad valorum.*

ILLINOIS WHEAT.—The price of spring wheat has materially advanced since the middle of the month. The demand comes chiefly from the mills of New York State, which find it so much better for flouring alone, as we, in August, assured them they would. As yet, the foreign demand has not been noticed. So little has reached New York, that a quotation for it in that market has scarcely ever been given. What will the price be when New York State is satiated?—*Wells' (Chicago) Commercial Express.*

PENNSYLVANIA COAL AND IRON.—There is more activity in coal at Richmond, and supplies are coming forward freely, both by railroad and canal. Orders from the eastward have increased, but prices remain without change. The present current quotations for Schuylkill coal, free on board at Richmond, are $3.15 a $3.25 for white ash, and $3.35 a $3.50 per tun for red ash. In bituminous coal, no change. There has been a good demand for pig metal, and the market is decidedly firmer. Sales of 4,500 tuns No. 1, at $23 a 23.50 per tun, six months; 400 tuns No. 2, at $22 a $22.50; and 100 tuns No. 3, at $20 a $20.50 per tun, six months. A sale of 500 tuns forge, on terms kept private. Some of the furnaces have already contracted for all they can make until the commencement of the new year.—*Philadelphia Commercial List.*



ISSUED FROM THE UNITED STATES PATENT OFFICE FOR THE WEEK ENDING OCTOBER 4, 1859.

[Reported Officially for the SCIENTIFIC AMERICAN.]

25,612.—James G. Abbott and Archilus Lawrence, of Philadelphia, Pa., for an Improvement in Stoves:

We claim the combination of the ring, R, perforated door frame, F, extending down over the ring and slide, B, with the stove cylinder, as set forth.

25,613.—J. C. Adams, of Greensburg, Ind., for an Improvement in Corn-planters:

I claim the arrangement of the clevis device, t, on the rear of the pole, s, when said pole is received through the mortise in the bar, and when the said bar is made adjustable by means of bolts and bolt holes through its ends and through the frame-pieces, A, said clevis device being made so as to clasptogether cross-pieces, c and c', all in the manner and for the purpose set forth.

25,614.—Charles Alden, of New York City, for an Improvement in Apparatus for Evaporation:

I claim the agitator so constructed as to be capable of acting as a blower as well as a stirrer, substantially as set forth.

25,615.—Albert J. Allen, of Buffalo, N. Y., for an Improved Steam Gage:

I claim, first, Capsule, G, of peculiar construction, having the steam admitted at one side and through the center of that side, and using the flexibility of both sides (such capsule being made of a permanently elastic metal, and not injuriously oxydized by steam or water, preferring for that purpose the metal used in making melodeon reeds), in combination with fulcrum block, F, lever, H, spring, P, rod, O, rod, I, swivel block, J, radius bar, L, and segment, K, having tail-pin, k, pinion, N, index-pointer, E, dial plate, D, and friction pressure spring, M, substantially as shown and described.

Second, I claim radius bar, L, in combination with rod, I, swivel block, J, segment, K, having tail-pin, k, pinion, N, index-pointer, E, and dial plate, D, having increasing divisions on its face, substantially as shown and described.

Third, I claim swivel block, J, in combination with rod, I, radius bar, L, and segment, K, having tail-pin, k, substantially as shown and described.

25,616.—John P. Allen, of Midville, Ga., for an Improvement in Seed-planters:

I claim the arrangement and combination of the frame, E, provided with the armed hub, g, the hopper, F, and its bar, G, in connection with the adjustable bar, I, provided with the self-adjusting covering plate or bar, K, substantially as and for the purpose set forth.

[This invention consists in a peculiar arrangement and combination of a covered hopper and seed-distributing device, whereby the hopper is effectually prevented from becoming choked or clogged, the machine allowed to work smoothly, and the seed perfectly covered, even when the machine is inclined or canted to either side, and the ground under cultivation rough or uneven.]

25,617.—Thomas Armitage, of Philadelphia, Pa., for an Improvement in Feed-water Apparatus for Steam Boilers:

I claim the vessel, C, with its valve, c, opening inwards, in combination with the pipes, D E F H and I, with their respective cocks and the drum, B, the whole being arranged in respect to the boiler, substantially as and for the purpose set forth.

25,618.—Henry F. Baker, of Centreville, Ind., for an Improved Mole Plow:

I claim the arrangement and combination of the screw, E, key, F, knife, C, share, G, and revolving-packer, H, as and for the purpose shown and described.

I also claim the employment of a revolving mole or packer, H, substantially as and for the purposes shown and described.

[This is an improvement in mole plows, and consists in attaching to the back part of the circular share a revolving, spirally-fluted frustrum of a cone, the share being fastened to the lower end of a cutting knife and the furrow being pressed down by a following roller. The arrangement is strong and compact, and will probably do good work.]

25,619.—H. H. Baker, of New Market, N. J., for an Improvement in Weeding-hoes:

I claim the arrangement of the piece, B, standard, D, plate, A, concave, E, and ferrule, F, as described, as and for the purposes substantially as set forth.

25,620.—O. D. Barrett, of Cleveland, Ohio, for an Improvement in Rotary Harrows:

I claim the arrangement of the hooks, H H, draught bars, G G, center-pins, B B' B B', arms, F F, and spring-joint, D, in relation to each other and to the harrows, as and for the purpose set forth.

25,621.—Wm. W. Batchelder, of New York City, for an Improvement in the Construction of Vapor Burners:

I claim arranging the orifice of discharge, i, from the retort, in reference to the open end of the gas-pipe, d, so that the sediment from the orifice cannot fall into said pipe nor remain about and choke the orifice, substantially in the manner and for the purposes set forth.

I also claim the entire disconnection of the pipe, d, and retort, as set forth.

I also claim the combination of the circular form of the gas-pipe, d, with the horizontal discharge, as set forth.

I also claim connecting the retort with the ascending part of the gas-pipe near the burner, as set forth.

25,622.—Mahlon Bonnell, of New York City, and Isaac J. Cole, of Tappan, N. J., for an Improved Machine for Cutting Veneers:

We claim, first, The arrangement of the cams, a a', or their equivalents, in combination with the log-carrier, A, substantially in the manner and for the purpose specified.

Second, The arrangement and combination of the log-carrier, A, with the tank, M, or its equivalent, substantially as and for the purpose described.

[A rotary log-carrier is employed, to the surface of which the logs are secured, so as to strike against a stationary cutter. As the logs rotate with the cutter they are dipped into hot water contained in a tank under the log-carrier, and the cutting operation is further facilitated by giving to the log-carrier a side motion, whereby a shear cut is produced and much power saved.

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25,623.—Nathaniel Bourne, of Peosta, Iowa, for an Improvement in the Construction of Evaporating Apparatus:

I claim the arrangement and combination with the evaporating pan, A, of a series of partitions and shutters, substantially as and for the purpose shown and described.

25,624.—B. B. Briggs, of Sharon, Ohio, for an Improvement in Apparatus for Laying Drain Tile:

I claim the described clutches, consisting of the block or body and the fingers, H H′ H″ and F F′, constructed and operating as set forth, in combination with the rope, C, or its equivalent, and hook, B, when these several parts are arranged and operated substantially as specified.

25,625.—Robt. C. Buchanan, of United States Army, for an Improvement in Knapsacks:

I claim the combination of the body yoke and end pockets to the knapsack, the whole being combined and operating substantially as set forth.

25,626.—J. A. Buckwater, of Kimberton, Pa., for an Improvement in Brick Molds:

I claim the expanding frame, B′, formed of the movable plates, c c′ h*, and fitted within the frame, A′, provided with the inclined or taper pendants, d, and inclined slats, L L′, the plates, c c′ h*, being connected respectively to the pendents, d, and slats, L′, by the pins, f, and staples, g, substantially as and for the purpose set forth.

[This invention consists in constructing the molds in such a manner that all their sides may expand and permit the compressed clay to be readily removed from the molds.]

25,627.—Erastus Toucy Bussell, of Covington, Ky., for an Improved Measuring Faucet:

I claim operating the cut-off by a rotary movement of the exhaust chamber, which comprises the measure proper, whereby the fluid is first admitted into said measure and then discharged therefrom.

I also claim a graduated plunger-rod, square or otherwise, so as to admit of stop notches on each side, independent of the others, into which a pin is forced by a spring, as set forth, or its equivalent.

25,628.—Lysander Button and Robert Blake, of Waterford, N. Y., for an Improvement in Supporting the Carriage Bodies of Fire-engines:

We claim the propping of fire-engines which are mounted upon springs by means of cams, a, or mechanical equivalent thereof, so arranged and operated as, by lever power, to throw the weight of the engine from and upon the springs, substantially in the manner and for the purposes set forth.

25,629.—G. A. Clark, of Farmington, Conn., for an Improvement in Fire-places:

I claim the described arrangement of caliducts, C D E E F G G H H′ and C′, when the same are applied to a fire-place, in the manner and for the purposes set forth.

[This invention consists in a peculiar arrangement of caliducts communicating with the fire-place of the ordinary description, or with any suitable fire-place, for burning wood or coal. These flues are arranged in such a manner that there can be no accumulation of soot or ashes in them, and so that all the ashes will fall into boxes, arranged in convenient places on either side of the fire-place, which can be readily removed and emptied. It also consists in causing the smoke to take a circuitous direction over and around the fire-place, and then conducting it up a vertical flue space to the chimney, so that the cold air which enters from the room is heated and allowed to escape again through suitable registers in the sides of the fire-place or in the adjoining apartment, or it may be conducted into the apartments above, or wherever it may be desired.]

25,630.—Powhattan Ellis Collins, of Mobile, Ala., for an Improvement in Cotton Gins:

I claim an adjustable hopper, as described, for changing and regulating the feed of cotton to a gin, as set forth.

I also claim, in combination with an adjustable and regulating hopper, the toothed cylinder, D, for conveying the cotton from the hopper to the ginning or saw cylinder, as set forth.

I also claim the arrangement of the hopper, feeding toothed roller, saw and brush cylinders, as shown, so as to operate in connection with each other, in the manner described.

25,631.—Garrett Cooper, of Jersey City, N. J., for an Improved Tray Bolt:

I claim the general arrangement of bolt, A, shield, B, ripple, C, and plate of metal, H, when said bolt shall effect its own spring, and when the said parts shall be arranged and operated in the manner described and for the purpose specified.

25,632.—Pearson Crosby, of New York City, for an Improved Manner of Hanging Reciprocating Saws:

I claim connecting the two plates, b b, of the caps, B, by means of rivets, d, and pins, g k, the ends of which are fitted in holes countersunk at the inner sides of the plates to admit of the vertical adjustment of the plates, b, for the purpose set forth.

I also claim encompassing the rivets d, of the cap, B, by tubes or cases, f, to form a bearing for the plates, b b, and prevent an undue pressure of the caps against the saw, so that the latter may be adjusted to compensate for wear, as specified; it being understood that I do not claim, broadly, the tubes or cases, f, but only when used in connection with or applied to the caps, B, for the purpose set forth.

25,633.—Joshua Davis and Sarah N. Davis, of Muskegon, Mich., for an Improved Bread and Vegetable Slicer:

We claim the arrangement and combination of the adjustable slotted plates, H, gage, I, rod, h, spring, J, and lever, F, as shown and described, so that the slice of bread shall be supported by the gage until the stroke of the knife is almost finished, and so that the gage, I, shall fall outwardly on the depression of spring, J, all as set forth.

[This invention consists in the employment or use of a rising and falling knife provided with V-shaped or sickle teeth, in connection with a platform or bed and yielding gag, the whole being so arranged that bread, vegetables, &c., may be cut very expeditiously into slices, all of uniform thickness, which are allowed to discharge themselves freely from the device.]

27,634.—Wm. H. Davis, of Taunton, Mass., for an Improved Blind-fastener:

I claim the application to the catch, of a box, to secure it from getting out of place, and of the hook on the blind a rest to prevent the blind from sagging, as described.

25,635.—Robert Dick, of Toronto, Canada, for an Improvement in Accountant Labels for Periodicals, &c. Patented in Canada, July 26, 1858:

I claim the contrivance of keeping accounts in printed form by the use of printer's type, or their equivalents, kept so arranged as to admit readily of all the re-adjustments which the currents of business may require, in manner substantially as set forth.

Based on this primary invention, I also claim the device of rendering or transmitting accounts thus, or substantially thus kept in type, by sending printed impressions taken therefrom, though the particular form of sending may not be mine. While at the same time I claim, in the broadest and fullest, the special mode and form set forth by use of the machine described, as constituted by the combination of fluid vessel, reel, apron movement and cutter-stamp, which machine I also claim, with all the modes indicated for operating the same and in connection with the recited claims I thus formally make.

I also claim all other means and appliances, substantially the same as those claimed or intended to be claimed.

25,636.—Mason H. Ford, of New York City, for an Improvement in Borer for Excavating, Mud, &c.:

I claim, first, The construction of revolving excavating scoops, provided either with openings and wings or flanges on its sides, capable of opening and shutting, or so constructed that part of the sides may be opened, and act in that position as wings or flanches, by which the dirt, mud or sand is, during the revolving of the scoop, thrown into the inside of the scoop, as described.

Second, I claim the manner of attaching scoops to the shafts, so that the same will be made to turn with the shaft when the same is revolving, and at the same time capable of being raised above the surface of the water, when filled for the purpose of being emptied, without requiring to raise the shaft, substantially as described.

26,637.—Peter Getz, of Lancaster, Pa., for an Improvement in Cooking-stoves.

I claim the specific arrangement of the boilers, O H H, drum-head oven, C, and their combination in manner as set forth, for the purpose specified.

25,638.—Wm. D. Guseman, of Morgantown, Va., for an Improvement in Weighing-scales:

I claim the triangular recess cut out on the under side of the journals of the pendulum drum or shaft, to enable said drum to swing or roll on its axis on the upward pointing-knife edges, g, substantially in the manner and for the purpose described.

I also claim, in combination with an upward pointing-knife edge, a roller or pendulum drum, the journals of which are formed with triangular recesses and a counterpoise weight, or its equivalent, vibrating below the center of the drum or roller, substantially in the manner and for the purpose described, and this I claim whether the counterpoise be adjustable on its lever or not.

25,639.—Henry Hays, of New York City, for an Improved Stave Machine:

I claim dressing staves by a continuous operation, regardless of length or thickness, by the combined action of the feed rollers, c d, and cutters, u v, when said parts are arranged as set forth, to remove a shaving from the outer side of the stave, under all circumstances, and split out more or less from the inner side to reduce the stave to a uniform thickness, as specified.

25,640.—Joseph Harrison, Jr., of Philadelphia, Pa., for an Improved Steam Boiler:

I claim the construction of a boiler of distinct globular or spherical parts, single or in groups, substantially as described, united in the manner specified, or any other analogous thereto, and wherein the strength of the globular form of such parts is common to the entire structure; this claim being intended to include not true spheres only, but elliptical, conical, polyhedral, or any other analagous forms also, where the results looking to strength and construction of the boiler are substantially the same as those enumerated.

I also claim the employment, as units of construction, as hereinbefore explained, of separate chambers of cast-iron or other metal, of uniform size and shape, substantially as described, to be used as wanted, wherewith boilers of different forms and dimensions may be built up, being united together in the manner specified, or any other analagous thereto.

Both of the above claims involve an outside casing for the particular construction, with furnaces, substantially as described. It is not, however, my intention to confine myself to any special form or boiler or mode of casing the same.

25,641.—Joel Haines, of West Middleburg, Ohio, for an Improved Device for Connecting the Panels of Portable Field Fences:

I claim the jointed link, J, for connecting the ends of the panels, so arranged that by using a tapering key in the link, the angle of a zig-zag fence may be made more or less obtuse, as required, to make the fence stand firm in the position in which it is placed.

25,642.—W. M. Henderson, of Baltimore, Md., for an Improvement in Pumps:

I claim the two ball valve cages, with the suction valves in their interior, attached to the extremity of a central perforated tube, or its equivalent, in combination with the water-ways and discharge valve, when constructed and operated substantially in the manner and for the purposes set forth.

25,643.—Thompson Hersee and Pierre Jos. Bourgnon, of Buffalo, N. Y., for an Improvement in Faucets:

We claim, first, The relative arrangement of the valve, H, chamber, F, and spherical part, D, in combination with the plug, B, said valve having a lifter, K, and stem, L, the whole operating substantially as described.

Second, The combination and arrangement of the lifting-rod, N, valve, o, tube, P, and pipe, 4, with the cross-piece, L, for the purpose of ventilating the barrel at each draught, substantially as described.

22,644.—John B. Holmes, Jr., of New York City, for an Improved Curtain Fixture:

I claim the spring, d, in combination with the roughened V-shaped, grooved pulley, b, an endless cord or band, b′, said parts being arranged to operate in relation to each other, as specified.

I also claim the brackets, c c′, provided with the center-pins, 1, entering the roller ends, b b2, in the manner and for the purposes specified.

I also claim forming the bracket, c, with the slot and open ring, 3, and the bracket, c′, with a hook-shaped slot, 2, to afford opportunity of removing the whole of the parts without having to draw the screws or nails passing through said brackets, as specified.

25,645.—Lewis Hover, of Flushing, N. Y., for an Improvement in Signal Lanterns:

I claim the arrangement and combination with the case, A, and lamp, C, of the metallic cylinder, D, and glass cylinder, E, substantially as and for the purpose shown and described.

[This invention consists in placing within a lantern provided with a colorless glass globe or sides, a colored glass cylinder or chamber, so arranged as to admit, by a very simple adjustment, of being raised entirely above the flame of the lamp, or lowered so as to encompass the flame, whereby the latter may be made to emit either a white or colored light; the lantern can be used both for ordinary illuminating purposes and also for a signal lantern, as may be required.]

25,646.—Job F. Howland, of New York City, for an Improved Tool for Cutting Gas-pipe:

I claim the arrangement of a stationary iron frame with a slot in it, which terminates in a conical form at one end, in combination with a sliding jaw having a V-shaped tongue and with an adjustable sliding-cutter, substantially as and for the purposes set forth.

[This invention relates to an improvement in the tool which is used manually by the fitters-up of gas-pipes and other workers in tubing, for cutting off tubes or pipes. The object of this invention is to facilitate the adjustment of the cutter to the tool, so that it may be readily detached and sharpened when necessary, and also readily secured in the tool and rendered capable of being reversed, so that either end may be used.]

25,647.—J. W. Howlet, of Greensboro', N. C., for an Improved Mode of Disinfecting Feathers:

I claim the injection of combined steam and chlorine gas among the feathers, substantially as shown and described.

[This invention consists in disinfecting feathers by placing the same within a suitable retort into which a combination of steam and chlorine gas is ejected, the steam and chlorine gas being generated in a suitable boiler containing water and chloride of lime, or other substance or substances which would generate chlorine gas, and the whole so arranged that the desired work may be thoroughly and expeditiously performed.]

25,648.—B. C. Hoyt, of Port Washington, Wis., for an Improved Vegetable-cutter:

I claim the arrangement of the cutting-box upon a vibrating lever, C, when the lever is supported by a spring, E, actuating arm, D, for keeping the whole in an elevated position, as set forth.

I also claim the combination of slide, H, angular slotted box, K, and vertical cutters, J, arranged and operating substantially in the manner and for the purpose set forth.

[This invention consists in pivoting a lever or frame to a standard fixed to a bench or any suitable stand, upon the top of which lever is fixed an angular box, of either metal or wood, provided with longitudinal slots extending from end to end, under which the articles to be cut are placed; and in operating a slide, which is immediately under this box, armed with vertical knives passing up through the slots in said box, by means of a jointed arm, spring and lever, upon which the box itself is fixed, so as to give to the knives a reciprocating motion and a draw cut upon the inclined edges of the box.]

25,649.—Rameth Hussey and Uriah Thornburgh, Sr., of Walnut Run, Ohio, for an Improvement in Mole Plows:

We claim suspending the plow-beam that carries the mole to the plow-frame by means of ropes or chains, connecting its ends to one capstan, in combination with suitable catches for holding it at any adjusted hight thereon, the whole being arranged in the manner and for the purpose set forth and explained.

We also claim, in combination with the rotary mole, suspending the plow-beam by both its ends to ropes or chains which connect with a common capstan on the plow-frame, in combination with racks and pawls for holding said beam when adjusted, the whole being arranged for the purpose and substantially in the manner stated.]

25,650.—I. E. Jones, of Cincinnati, Ohio, for an Improvement in Spark-arresters:

I claim the arrangement of the tank, A A′, wind-wheel, g, and agitator, k, with reference to the receiving trunk, F, and valve, l, all being constructed and arranged to operate conjointly as described, and for the purposes set forth.

25,651.—M. C. Kilgore, of Washington, Iowa, for an Improvement in Rotary Harrows:

I claim the arrangement and combination of the windlass, E, arms, I, socket, N, collar, J, harrow, P, and spindle, K, as and for the purpose shown and described.

[This invention consists in suspending from a pivoted collar, fixed centrally to a shaft mounted upon wheels, a rotary harrow supported or swung by chains or cords which pass round a windlass, so that the harrow will be rigidly attached to the frame or axle of the machine, at the same time it can be raised or depressed, or inclined to the surface of the ground.]

25,652.—H. B. Knowles, of Providence, R. I., for an Improved Attachment to Treadles of Sewing-machines:

I claim the employment of a yielding adjustable rod, having a crosshead with hooks at its upper end, in combination with a shackle-bar, crank-shaft, and treadle, substantially as and for the purposes set forth.

[The object of this invention is to prevent the crank of a sewing-machine, or of any other machine which may be operated by a treadle, from slipping on to the dead point, and to connect the treadle to the crank in such a manner that the machine can always be started with the foot in the right direction, while it is impossible to turn it in the wrong direction, except by force or by the aid of the hands. A spring is connected to the shackle-bar in such a manner that it begins to act on the same as the crank approaches the dead points. When the machine is turned in the right direction, the spring pushes the crank beyond the dead points; but if an attempt is made to turn the crank in the wrong direction, said spring opposes its passing the dead points.]

25,653.—Philip Koch, of New Haven, Conn.. for an Improvement in Punching Metals:

I claim, first, The employment or use of a series of arbors to which punches or shear-blades are attached, fitted in a rotating or adjustable head, d, when said head is connected with an arbor, B, having a plate, c, attached, provided with bolsters, c′, and shear-blades, f, corresponding with the punches and shear-blades of the head, substantially as and for the purpose set forth.

Second, The means employed for actuating the yoke, H, and consequently the arbors, e, to wit, the adjustable shaft, K, provided with the eccentric, J, pin, w, fitted within the block, L, of yoke, H, the adjustable shaft, P, provided with the lower crank, r, and the recess, v, in the back part of plate, o, to receive pin, w, substantially as and for the purpose set forth.

25,564.—E. D. Lee and Z. W. Lee, of Blakely, Ga., for an Improvement in Plows:

We claim the arrangement of the peculiar curved clevis, I, beam, A, curved rod, E, bar, D, band, G, wedge, H, shank, f, projection, h, and share, F, as specified for the purpose set forth.

[This is an improvement in the single shovel plow, the object of which is to facilitate the removal of the share, either for the purpose of being sharpened or being exchanged for another. A metal bar is firmly fastened to the beam, being inclined forward at an angle, and the share is fastened to this bar by means of a hoop and wedge. The clevis also and the other parts are simply arranged.]

25,655.—L. E. Lincoln, of Lowell, Mass., for an Improvement in Safety Apparatus for Steam-boilers:

I claim the application of a low water alarm to more than one boiler (or to one) by means of a two or more legged tube, a simple or a compound siphon, in such manner that said tube shall keep said alarm charged with water, when all its pendant ends are covered by water, and shall cause said alarm to be supplied with steam, when any one of its pendant ends is exposed to steam, substantially as set forth and described.

25,656.—W. T. Littlejohn, of Kalamazoo, Mich., for an Improved Mangle:

I claim the arrangement of the levers, D D, with roller, C, at their upper end, the spring, F, bar, G, connected to the treadle, I, by the rope, H, in combination with stationary roller, B, substantially as and for the purpose set forth.

[This invention consists in an improved mode of graduating the pressure of the rollers on the clothes, whereby the mechanism is placed under the complete control of the operator, and the device rendered extremely simple and efficient.]

25,657.—Cornelius Mahoney, of New York City, for an Improvement in Musical Notation for the Blind:

I claim the combination of letters and characters, or notes, in embossed print, so as to represent music for the blind, substantially as set forth.

25,658.—Newton S. Manross, of Bristol, Conn., for an Improvement in Valves for Retarding and Arresting the Flow of Gases:

I claim the use of a re-curved or V-shaped tube, or passage, having its lower part connected with a well, or reservoir, containing quicksilver, which is made to rise within the tube, by means of a plug, or other equivalent pressure, substantially in the manner and for the purpose specified.

I also claim the combination of such re-curved tube, closed by quicksilver, with the regulating apparatus, consisting of a tapering shoulder, and movable rod, secured from leakage, by passing through the quicksilver.

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25,659.—H. Marshall, of Cincinnati, Ohio, for an Improvement in Coffins:

I claim the new article of manufacture named, to wit, a coffin having its bottom ends and sides wholly constructed of corrugated sheet metal, which is rolled or stamped into proper form, and surrounded at the upper edge of its body with a wrought or cast-iron frame, which serves as a brace to the body, and a hold-fast for screws, substantially in the manner and for the purpose described.

[An engraving and description of this invention will appear in a few weeks.]

25,660.—N. B. Marsh, of Cincinnati, Ohio, for an Improvement in Hydrants:

I claim the arrangement, in connection with the main casing, G, discharge-pipe, S, and air-chamber, E, of a hydrant of the upper and lower plunger, or valve-chamber, A C, made in one piece, F, upper plunger or valve, D, when composed of parts, k l m n r, and lower conical guide and stop-plunger, composed of parts, B h i, the whole being constructed arranged and used together, in the manner and for the purpose described.

[This invention relates to the details in the arrangement and construction of that class of hydrants which have two pistons or plungers, and consists in the connection of an air-chamber with the lower cylinder, in the mode of packing the pistons, and in the arrangement of the several parts in relation to each other. It was evidently made by a practical man, and appears to be well arranged.]

25,661.—J. Plympton Marshall, of Millbury, Mass., for an Improvement in Breech-loading Fire-arms:

I claim, first, The combination of the lock bolt (of the movable breech) or its equivalent, and the discharging lock of the arm, with intermediate parts, for the purpose above set forth.

Second, Arranging the lock for the tape-primers in the manner above described for the purpose specified.

25,662.—Edwin May, of Indianapolis, Ind., for an Improvement in the Construction of Prisons:

I claim, first, The angle door, D, in combination with the safe lock or bolt, I, when constructed and operated substantially as set forth.

Second, The safe, J, containing the drum, p, and bolt, I, and being held by the outer door, C, when constructed and operated substantially as and for the purpose set forth.

Third, The endless chain or rope, e, in combination with the levers, d, when constructed and operated substantially as and for the purposes set forth.

Fourth, The combination and arrangement of the levers, b, bar, a, and bolts or lugs, s, when operated from without the grating, i, substantially as and for the purposes set forth.

25,663.—Edward Maynard, of Washington, D. C., for an Improvement in the Back-sight for Fire-arms:

I claim the device as set forth: viz. the grooved cylindrical end of the sight carriage in combination with a spring bolt or pin, of such form that it shall fall into the grooves and bear against their two sides, and yet not touch the bottoms of the grooves, so that as it wears it will still press on the sides of the grooves, and hold the carriage firm in either of its positions.

Second, I claim the device as set forth of placing the spring and its bolt or pin, within the stock or breech of the gun for its more perfect protection from wet and damage by accident, the opening through which the pin acts being susceptible of being closed without oil or packing.

25,664.—Edward Maynard, of Washington, D. C., for an Improvement in the Nipples of Fire-arms:

I claim the permanent union of a cap or nipple, a, with the closed end of the tube, b, whose open ends has screw-threads formed within it, by which I am enabled to combine the said nipple and its tubular seat with the abutment, d, of the breech-piece of a fire-arm, by means of a transverse perforation in said abutment, for the reception of the tubular nipple-seat, and a nick-headed screw, c, inserted into the left-hand end of said perforation, and working into the screw threads, in the open end of said tubular nipple-seat, substantially as herein set forth.

25,665.—John McCluskey, Jr., of South Boston, Mass., for an Improvement in Skates:

I claim the jointed heel strap, C, as set forth, in combination with the toe strap, B, when the latter is made longitudinally adjustable upon the runner, A, substantially as specified.

[This invention consists in constructing the skate so that the toe strap will have a longitudinal adjustment upon the runner, and provided with an adjusting screw for fixing it at any desired point adapted to the size of the foot. The invention further consists in hinging the heel strap and plate to the rear of the runner, and fixing it rigidly thereto when the skate is on the foot, by a suitable spring-catch or thumb screw.]

25,666.—William Howard Mitchell, of San Francisco, Cal., for an Improvement in Window-sash Supporter:

I claim, first, The roller, A, arranged on an angular double-jointed arm, B B C C, so as to have slight play up or down between two stops, E G, accordingly as it is operated upon by a spring, F, or the weight of the sash, N, substantially as and for the purposes set forth.

Second, The combination of the angular double-jointed arm, B B C C, spring, F, thumb-piece, H, friction roller, A, and semi-circular recess, m, in the window frame, substantially as and for the purposes set forth.

25,667.—Mortimer Nelson, of New York City, for an Improved Gold-washer:

I claim, first, The combination of a series of concave plain pans, with a series of convex riffled pans; said pans all being arranged on the same vertical shaft, substantially as and for the purposes set forth.

Second, The arrangement of a horizontal cam wheel, ball, horizontal friction roller, two bevel wheels, a rising and falling driving-shaft, and a collar on the vertical shaft, for operation together, substantially in the manner and for the purposes set forth.

Third, The combination of a revolving perforated platform or grating, with a non-revolving, but yielding raking device, substantially as and for the purpose set forth.

Fourth, The combination of the stationary case with the revolving perforated platform, raking device, and the horizontally-revolving pans, substantially as and for the purpose set forth.

[This gold-washer consists of a series of four shallow concave pans revolving with a shaking motion on a common vertical shaft, half of the pans alternately being provided with riffle bars, and the other half being plain. The water flows over the rim of the plain pans, and is caught by the larger riffled pans, through which it flows over the riffle bars and passes out at the center into the succeeding plain pan.]

25,668.—Nelson Orcutt, of Binghampton, N. Y., for an Improvement in Composition for Soap:

I claim making soap from untried or unrendered tallow or grease, and the other ingredients named, the ingredients being in the proportions as stated.

25,669.—Lewis Pagin, of Elmore, Ohio, for an Improved Combined Table and Clothes-dryer:

I claim a combined table or stand, and a clothes-dryer, composed substantially of a table or stand, with a reversible top, and a box, drawer or recess, and two or more jointed arms that will fold up and lie within said box, drawer, or recess; the whole being combined and arranged for the purpose set forth.

25,670.—Benjamin S. Pardee, of Mount Carmel, and Thomas Rawlings, of New Haven, Conn., for an Improved Upholstery Nail:

We claim as a new article of manufacture the paper-headed nail, or tack, substantially as described.

[This invention consists in a nail with a paper head, and is intended to take the place of the ivory-headed nails used for carriage-trimming, upholstery, &c. The heads can be formed of various colors and are much harder and less liable to split in driving than ivory heads.]

25,671.—Seneca Pierce and Frederick F. Beardsley, of Castle Grove, Iowa, for an Improvement in Composition for Tanning:

We claim a composition for tanning, made of terra-japonica, alum, glauber salts, and saltpeter, in the proportions and manner herein set forth.

[Terra-japonica purified in a peculiar manner is employed for tanning, according to this invention, whereby tanneries may be erected anywhere, near the market, without being dependent on the bark of trees which are fast disappearing. The method of manipulating the skins is just the same as the modes in common practice; the tan liquors alone are different; these are suitable for tanning all kinds of skins and hides, and make excellent leather.]

25,672.—Josiah W. Prentiss, of Pultney, N. Y., for an Improved Mode of Restoring Rancid Butter:

I claim the mode described of restoring rancid butter in the firkin by removing the hoops so as to open the joints, enclosing it in a bag, or other textile fabric, and then surrounding the whole with charcoal substantially as described and for the purpose set forth.

25,673.—James Purmton, of Lynn, Mass., for an Improved Machine for Lasting Boots and Shoes:

I claim the clamps, A A A A, in combination with the slides, B B B and C, for the purposes described, said clamps and slides being carried to their place by their levers, I I I I, and J J J J, or their equivalents.

I also claim the opening and closing slide, C, and figure 2, also the roughing or cutting slide, D, figure 3, for the purposes described.

25,674.—Edward A. L. Roberts, of New York City, for an Improved Lathe Chuck:

I claim the application and use of the ball-and-socket joint in combination with the mandrel or chuck of lathes, substantially as and for the purposes set forth.

25,675.—Christian Ropp, of McLean county, Ill., for an Improvement in Corn-planters:

I claim the arrangement of the dog-wheel, P, levers, u″, and u‴, stops, u and u′, with stops, f, springs, s, bent rods, g, and feed wheels, F F′, the whole being constructed substantially as and for the purpose set forth.

25,676.—O. Sage, of Wellington, Ohio, for an Improvement in Cheese Vats:

I claim the combination of the furnace, D, and smoke-pipe, e, with the open and curved bottom, b′, of the water box, b, pipe, E, equalizer, G, and milk box, e, said parts being constructed, arranged, and combined and operating substantially as and for the purposes set forth.

25,677.—Jacob Seebold, of New Berlin, Pa., for an Improvement in Grain Separators:

I claim attaching the separator to the thresher by rocking-frames, c and f, in combination with wheel, W, rod, d, slotted arm, b, and springs, s, for producing its reciprocating movement, substantially as described.

25,678.—Samuel R. Seibert, of Munising, Mich., for an Improved Surveying Instrument:

I claim constructing the "Ys" or supports of the telescope in a surveying instrument, as set forth; also constructing a clamping pinion in the manner and for the purposes described.

25,679.—J. H. Shireman, of East Berlin, Pa., for an Improvement in Dividers for Harvesters:

I claim the combination of the adjustable case, B, with the stationary horizontal dividing point, A, the parts being constructed and arranged in the manner and for the purpose set forth.

25,680.—Thomas P. Sink, of Fairton, N. J., for an Improvement in Oyster Dredges:

I claim the arrangement and combination of the chuck or block, A, and its pulley, B, with the roller, E, the respective parts being formed and operating substantially in the manner and for the purpose set forth.

25,681.—Seymour Smith, of Sharon, Conn., for an Improved Saw-set:

I claim the mill saw-set described, as a new article of manufacture; the several parts A, B, and F, being constructed and arranged substantially in the manner and for the purposes set forth.

25,682.—Leonard Snider, of Indianapolis, Ind., for an Improvement in Covering Coffins:

I claim using and applying flock as a covering for coffins, whether the same is prepared or secured or in the manner set forth, or in any other manner substantially the same.

25,683.—Charles L. Stacy, of Cincinnati, Ohio, for an Improvement in Hydrants:

I claim the relative arrangement of the cup-formed disks, F, G, and G‴, and the apertures, K, and L, adapted in the manner set forth, to form a chamber, I, closed on all sides (with the exception of the ingress aperture, K) while the hydrant is open, for the purpose of expanding the flanges, f, and g, and upon the closing of the hydrant to uncover the aperture, I, and thereby empty the discharge-pipe, C.

25,684.—James E. B. Stuart, of Wytheville, Va., for an Improved Mode of Attaching Sabres to Belts:

I claim the attachment hook, H, in combination with the ring, O, P, or its equivalent, attached to the waist belt, as indicated in the drawing, M; the whole being constructed and operated substantially as and for the purpose set forth.

25,685.—W. H. Stuart, of Millington, Md., for an Improvement in Seed-planters:

I claim, first, A double corn-planter, the parts of which are constructed, combined and arranged to operate in relation to each other as described.

Second, Connecting the two independent sets of valves by means of the flexible connection, H, in combination with single-operating chain or cord, H′, as and for the purposes set forth.

25,686.—H. K. Symmes, of Newton, Mass., for an Improvement in the Construction of Gas-burners:

I claim the combination with the inverted cup, D, and tube, C, and the quicksilver basin or basins, or their equivalents, forming a movable connection between the base, and tip of the burner, operating as described of the pawl-like rod, or its equivalent, attached to the cup, and a rest for said rod attached to the base of the burner, the whole operating as described to shut off the gas from the tip by the temporary increase and subsequent reduction of the pressure in the pipes.

25,687.—George S. Tiffany, of Palmyra, Mich., for an Improvement in Tile Machines:

I claim the extension of the flanged feeding-shaft, C, so as to form a revolving-core, C′, operating substantially as shown and described.

[This invention consists in the use of a hopper, or mud receptacle with a tube attached, and a rotating screw-shaft, fitted in the tube and in the hopper, the parts being so arranged that the tiles are formed by a continuous operation in a very expeditious manner, and in a way well calculated to form perfect and compact tiles, the air during the operation of forming, being fully expressed from the clay, so that the tiles will not be liable to crack while being burned.]

25,688.—George W. Tolhurst, of Liverpool, Ohio, for an Improvement in Corn-shellers:

I claim the flexible hinged apron in combination with the disk, B, and flange-wheel D, when the several parts are constructed and arranged for operation in the manner described and for the purposes specified.

25,689.—Philip Ulmer, of New York City, for an Improved Spring-bed Bottom:

I claim the method described of connecting the spring, b, or its equivalent means, by which the same is secured in place by contact between compressing surfaces, substantially as and for the purposes set forth.

25,690.—Rufus M. Varmer, of Oxford, Miss, for an Improvement in Corn-planters:

I claim the arrangement of the table, r, delivering-tube, h, furrow plow, j, feeding-disk, g hopper, f, all attached to the rear end of the tongue and placed between and subject to the action of the straps, and the springs, as herein described and in connection therewith.

I claim the combination of the spaces, p, of the hopper's side, with the India-rubber strip, the beveled edge of the hopper's bottom, and the gouged holes of the feeding-disk, as and for the purposes set forth.

25,691.—John Wagner, of Philadelphia, Pa., for an Improvement in Machines for Hoisting Ice:

I claim, first, The combination of the slides, carriages, supporters, and projections on the chutes, arranged and operating in the manner and for the purpose specified.

Second, The anti-friction rollers, y y y′, &c., in connection with the slides, arranged and operating as specified.

Third, The counterbalancing-rope or chain and rollers, K and K′, in combination with the pulley, B, and the slides, S and S′, operating in the manner and for the purpose specified.

25,692.—Kasimir Vogel, of Chelsea, Mass., for an Improvement in Sewing-machines:

I claim, first, The employment, in combination with two or more needles, a b, or their equivalents, which work together to perforate or pass from one side to the other of the cloth or other material to be operated upon, and with suitable means of carrying a locking-thread through the loops of the threads of those needles; of a thread-conductor, Y, so applied and operated as to effect the interlacing of the threads of said needles on the opposite side of the material to that on which they are interlaced with the locking-thread, substantially as described, whereby they are made to produce the different kinds of stitching represented.

Second, The employment of a movable needle-plate, K, containing two or more needle-holes, of different size, form or arrangement, applied to the bed-plate or work-plate of a sewing-machine, in such a manner as to be capable of adjustment to bring either of its holes into position for the proper needles to work in it substantially as described.

25,693.—Henry Pritchard, of Brooklyn, N. Y., for an Improvement in Guide-rings for Fishing-rods:

I claim the combination of the fixed ferrule, f, and the movable thimble, c, with its eye, d, constructed substantially as described for the purpose set forth.

25,694.—John I. Vinton and Edward John, of Ironton, Ohio, for an Improvement in Furnaces:

We claim the employment in reverberatory furnaces of the water-space, as described, when constructed and fitted in place in the manner set forth.

25,695.—Chapman Warner, of New York City, for an Improved Clothes-clamp:

I claim the mode of securing, between the buttons, A and C, the garment, or whatever else may be placed between them, by means of binding or wedging effect of the pin, B, in the hole of button, C, with the spiral spring, D, as and for the purpose specified.

25,696.—A. L. Whipple, of Elmira, N. Y., for an Improvement in Machinery for Trimming Wall-paper:

I claim the manner of constructing the spool, with fixed rotating-head, D, and yielding head, C, in combination with the movable bed, B, for holding the roll firmly in the proper relative position to the knives, substantially as described.

25,697.—David Zug, of Shaefferstown, Pa., for an Improvement in Harvesters:

I claim the combination of the brace, V, with the gum-elastic stuffing-box, P, and the supporting-bar, Y, when the several parts are constructed and arranged in the manner described for the purpose specified.

25,698.—William Binkley, of Manchester, N. H. (assignor to Samuel N. Bell, of same place), for an Improvement in Knitting-machines:

I claim the hollow cone, 2, cut off elliptically, and with the parallel elliptical cam, R, on its inner surface, together with the projection, P, on the lower side, supported by the shaft, O, passing through the hollow shaft, S, and attached to the arm, Q, of the standard, No. 3, or other equivalents, substantially as described for the purposes set forth.

25,699.—Waldren Beach, of Baltimore, Md. (assignor to himself and John L. Reese, Jr., of same place), for an Improvement in Corn-harvesters:

I claim the vertically-adjustable cutting-apparatus, C, in combination with rests, R R′, lever, L, jointed arms, A, and spring, f, operating substantially as and for the purposes set forth.

25,700.—A. D. Brown, of Columbus, Ga. (assignor to Sallie C. Brown, of same place), for an Improvement in Straw-cutters:

I claim the arrangement and combination of the yielding strips, a, constituting guard, R, with the wheels, D, sash, L, and trough, B, as and for the purpose shown and described.

[This invention consists in arranging a guard under the drum of the feed-wheels and between the wheels, so that the straw, in being fed by the wheels to the knives, will be depressed into the channel of the straw-box, and prevented rising by the action of the feed-wheels.]

25,701.—James Draper, of New York City (assignor to himself and Samuel H. Dougherty, of same place), for an Improvement in Skeleton Skirts.

I claim the new manufacture of skeleton skirts described, in which the hoops, B, are secured by glue or equivalent cement, between separately woven parts of the tapes, in contra-distinction to the stitched or clasped skirt when the parts are woven together as single tapes between the hoops, and separately as distinct tapes, at the points where the hoops are received.

25,702.—Nathan C. Lewis, Jr., of Boston, Mass. (assignor to himself and Edwin Bruce, of same place), for an Improvement in Construction of Dentists' Chairs:

I claim the combination of the adjustable body-rest with the chair I also claim the combination of the auxiliary or elbow-rest and the body-rest, applied to a chair.

I also claim the mode of applying the body-rest to the elbow-rest, that is, by means of an adjustable arm, c, applied and operating with respect to the elbow-rest as set forth.

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25,703.—James C. Miller, of Irwin, Ohio, Stillman A. Clemens, of Rockford, Ill., and Gilbert H. Clemens, of Urbana, Ohio, for an Improvement in Lining Underground Drains:

We claim, first, The method of making covered field-drains by lining the inside with hydraulic lime, mortar, or other suitable material.

Second, A conducting-tube connected with a coulter.

Third, A forcing-bar, with valve-pistons attached, and working in a conducting-tube.

Fourth, A follower of less transverse dimensions than the mole to which it is attached, all substantially as described and for the specified purposes.

25,704.—James Molyneux, of Bordentown, N. J. (assignor to the Bordentown Machine Company), for an Improvement in Rotary Dredging-machine:

I claim, first, The combination and arrangement of devices, substantially as set forth and described, for raising, lowering and holding the levers, C C, which support and carry the dredging-wheel as required.

Second, I claim the rams on the dredging-wheel, for the purpose set forth, substantially as described.

Third, I claim the chute, hinged substantially as described, so that it may be raised when the socket passes under it, and lowered to receive the contents of the bucket, substantially as described.

Fourth, And, in combination with a hinged chute, I claim the arm, e, on the wheel, B, just before the bucket, for the purpose of raising the chute and allowing the bucket to pass under it.

Fifth, I claim a chute arranged to traverse on ways, so as that it may be adjusted to the dredging-wheel.

Sixth, I claim the levers, M, and links, M′, arranged to operate substantially as described, for the purpose of traversing the chute as described, for the purposes set forth.

Seventh, I claim the traversing-bars, P P, armed with picks or chisels, and arranged to operate on the bottom of the river, in advance of the dredging-wheel, substantially as described.

Eighth, I claim the shaft and wipers, in combination with the traversing-bars, carrying-picks, chisels, &c., for the purposes specified, substantially as described.

25,705.—John Sloan, of Pittsburgh, Pa. (assignor to himself and Eberhard H. Dierker, of same place), for an Improvement in the Construction of Distilling-apparatus:

I claim, first, The combination and arrangement of the condensing-worm or pipe, F, the wheels, h i and j, the receiving-chamber, x, with the governor, g, and valve, o, for the purpose of regulating the quantity of steam in the heating-pipe, d, as described and for the purpose set forth.

Second, The combination and arrangement of the chambers, A B C and D, with the conducting-pipes, e, when used in connection with the condensing-worm or pipe, F, as described and for the purpose set forth.

25,706.—Adolph Stempel, of Newark, N. J. (assignor to himself and Owen McFarland, of same place), for an Improved Trace-trimmer:

I claim, first, The arrangement and combination of the vertically-sliding spring-bar, C, laterally adjustable bed-pieces, D D′, and suspended curved cutters, F, substantially as and for the purpose described.

Second, In combination with the bed-pieces, D D′, and cutters, F, I claim the adjustable jaws, E, or their equivalents, arranged substantially as and for the purpose specified.

[This invention is calculated to do the very tedious work of trimming and rounding the edges of traces, &c., in a simple and easy manner. The traces are placed upon adjustable bed-pieces, which are supported by a vertically-sliding spring-bar. Behind the bed-pieces curved cutters are arranged, and if the traces are pushed through between said cutters, their edges are trimmed to the required shape.]

25,707.—David L. Stiles, of Rochester, N. Y. (assignor to John M. French & Co., of same place), for an Improvement in Molding Stove-covers:

I claim the employment of the cone-form plugs, d d, and pivoted thumb-levers, f f, in combination with that portion of the pattern which forms the recess of the cover, substantially in the manner and for the purposes specified.

25 708.—Wm. F. Stewart, of Patuxent Forge, Md., for an Improvement in Railroad Car-brakes:

I claim the combination of the various parts of the apparatus described, when so constructed and arranged in relation to the means by which they are actuated as to apply and release the brakes upon the whole train, upon sections or upon single cars, by the engineer, or by one or more of the brakemen, or by all or part of them, collectively or individually, the brake-apparatus of each car or of each section being complete in itself when the cars are uncoupled or the train divided into sections.

RE-ISSUE.

James M. Clark, of Philadelphia, Pa., for an Improvement in Flour-bolts. Patented July 26th, 1859; re-issued October 4th, 1859:

I claim, first, The slide-valve or valxes, d, arranged and operating with the apertures, e e′, in the sides of the bolting-chest so that either of the apertures can be opened or closed, or both closed when required, for the purpose of turning the material as desired in either of these directions as set forth.

Second, I claim, in combination with these valves, the concave, M, and scrapers, d′, upon the bolt, all arranged and operating as set forth.

ADDITIONAL IMPROVEMENTS.

Alexander, William and James Campbell, of Harrison, Ohio, for an Improvement in Corn-planters. Patented June 28th, 1859; additional improvement dated October 4th, 1859:

We claim, first, The described arrangement of the weighted-valve, V, rod, v, tappet, X, wheel, K k, slikes, H, and tube, D, for the purpose set forth.

Second, In the described combination with a cam-wheel, K k, crank shaft, M, rod, o, and rocking-lever, J j, we claim the inverted arch yoke, Y y, constructed and operating as set forth.

William R. Musser and J. Coleman, of Lynchburg, Va., for an Improvement in Tobacco-presses. Patented February 2d, 1858; additional improvement dated October 4th, 1859.

We claim, first, The top plate of the press, A, in connection with the bottom plate, c, of said press, used for retaining pressure and forming the bed of the main truck, constructed as described.

Second, The groove nuts for raising and lowering the top plate of the press, without taking it from the bars, as described.

EXTENSION.

William Trapp, Jr., of Dryden, N. Y., for Improvement in Barrel Machinery. Re-issued October 1st, 1845; again re-issued March 10th, 1849:

I claim, first, The combination of the slide-rest, K, guided in the manner set forth forth, with the tool, L, for turning off the cask, constructed and arranged in the manner set forth.

Second, I also claim the apparatus for chamfering, and howelling, and crozing; that is to say, the combination of the cylinder, E, open at both ends, so that both ends of the cask can be worked off without changing, with the ring-chucks, O, for fastening the cask into the cylinder, and with the tools as described for chamfering and howelling.

Third, I also claim the crozing-tool, V, with the changeable face-plate, w, as set forth.

Fourth, I likewise claim the combination of the stock, l, cutter, l′, adjustable and gage-plate, l″, constituting the tool for turning and smoothing the outside of the cask, as described and represented.

Fifth, I likewise claim the peculiar construction of the tool for howelling the cask as described and represented.

Sixth, I likewise claim the peculiar construction of the tool for chamfering the ends of the cask as described and represented.

Seventh, I likewise claim the mode of edging and jointing bilge stave, for making barrels and other bilge-work, by the employment of a swing frame having a concave or convex bed in or against which the staves is sprung and secured to the required bilge, in combination with the revolving edging-saw and reciprocating straight-jointer, or either, whether the said swing frame for confining the stave in its bent position, and conveying it to the edging-saw and straight-jointer, be constructed, arranged and operated in the manner set forth, or in any other mode or manner that may be substantially the same, and by which analagous results shall be produced.

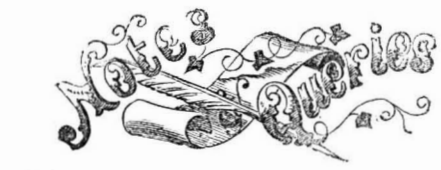
DESIGNS.

E. J. Cridge, of Troy, N. Y., for a Design for a Box Stove.

Jas. S. McCurdy, of Brooklyn, N. Y. (assignor to J. M. Myers, of New York City), for a Design for the Arms of Sewing-machines.

Garrettson Smith and H. Brown, of Philadelphia, Pa. (assignors to Hayward, Bartlett & Co., of Baltimore, Md.), for a Design for Stoves.

ERRATUM.—In our last week's list of claims, the patent of G. M. Mowbray, of Greenpoint, N. Y. (No. 25,575), was published as an "Improvement in the Process of Distilling Oils from Coke." The last word should obviously have been printed "Coal."



C. M., of Boston.—You may be right about the waters of the Dead Sea being more than 1.02 specific gravity, since the water in your harbor is 1.022. We gave the statement on page 205 of the present volume from what we considered good authority.

R. B., of Ga.—The ports of locomotives are made from one-tenth to one-eighth the area of the cylinder, and the steam-pipe should never be less. It is not uncommon to have the steam induction-pipe smaller than the exhaust; we see no reason for such a distinction. We advise you to use a pipe of an area as large as the ports of your cylinder—ten square inches—which will be a little less than one-tenth the area of your twelve-inch cylinder.

J. M., of Ill.—"If we was to speak," is not correct. It should be "If we were." "John's farm is good, but James's is the best," is not proper. James's is the better. The best cement for building purposes is composed of one bushel of lime to three or four bushels of clean sharp sand.

J. R., of Ohio.—From your description we do not understand what injury the barometer has received, or we might be able to tell you how to remedy it.

T. M. S., Jr., of Ga.—Adamantine candles can be made of tallow and lard. You will find a full description of the process in Morfitt's work on candle-making, published by Parry & McMillan, Philadelphia.

G. W., of Mass.—A small quantity of the oil of cloves, mixed with a solution of glue, it is stated, will prevent it from fermenting.

H., of N. J.—A weak solution of glue, mixed with whitewash, will prevent it from rubbing off. Do not use it very strong, or it will make the whitewash crack and then scale off. Any alkali, such as potash mixed with glue, will enable it to mix with an oily substance. An acid, as you have suggested, will not answer.

D. T., of Mass.—The Sheffield road-drift is a fine dust gathered from the surface of the roads in the vicinity of Sheffield. It is used to make a plaster for lining the furnaces which are employed in the manufacture of cast steel.

R. H. S., of Md.—We do not remember to have received such a communication as you speak of. Send a copy and do not be afraid to sign your name.

G. H. W., of C. W.—We do not know where you can procure one of Moore & Sargent's cross-cut sawing-machines, unless from the parties themselves. You had better write to them.

A. C., of Ohio.—The practice of the Patent Office, in such cases as you mention, is that, when a party, whose application has been rejected, allows the matter to rest for two years without taking any further steps therein, he is regarded as having abandoned his application, so far at least that the case will no longer be covered by the rule of secresy. You need not, therefore, be in haste about your case.

E. C. P., of Edinburgh.—Should you decide to secure your invention by patent in this country, the law would require of you to put the invention on sale within eighteen months after the patent is granted. The fee required of foreigners is abominable, and we favor its speedy abrogation. It is unwise and unjust.

F. E. A., of Texas.—A very simple method of rendering hard lime water soft is to add a portion of fresh lime to it, and allow it to settle. Take fresh slacked lime and mix a pint of it in five gallons of water, in a wooden pail; then stir it up and place one pint in 200 gallons of the hard water to be softened, stirring it all up thoroughly. Now, allow the whole to settle for five hours, when the clear water will be found soft and fit for washing, and if agitated for a few seconds it will be found fit for drinking. The fresh slacked lime takes up the excess of carbonic acid in the water, and the whole lime then precipitates to the bottom. This is called Dr. Clarke's process for softening water, and is a most valuable discovery.

A. P., of Mass.—There is no special work devoted to the manufacture of pianofortes. You will find considerable information on the subject in the recent English encyclopœdias.

W. H., of Mass.—Your plan for transporting vessels across the Isthmus by means of a railroad is an old idea, which has been long in use for transporting canal-boats, and has doubtless been thoroughly considered by all engineers in connection with the Isthmus transit.

J. Ellicott, of Durham.—Please to inform us in what State you reside, so that we may address you by letter. There are several Durhams in the United States.

G. W. B., of Miss.—By applying a piece of bright iron in a solution of sulphate of copper, a coat of pure copper will be deposited on the iron without the use of any common battery. This is no doubt due to galvanic action, and in this manner you may account for the iron nippers becoming coated with copper while you were making repairs on your telegraphic apparatus with them. As you suggest, a telegraph cable with a straight conductor is better than one with a spiral wire.

A. G. L., of Ill.—The first machine ever used for cutting nails is said to have been invented by Benjamin Cochrane, a shopmate of Eli Whitney. This inventor died at Batavia, N. Y., in 1846, at a good old age. His machine cut out the nail without a head. Previous to the date of his invention (1790), nails had been punched out of plates by hand in Connecticut; these also had no head. In 1810, the ingenious Jacob Perkins and Jonathan Ellis, of Massachusetts, erected the first machinery for cutting and heading nails at one operation. In 1792, cut-nails were first made in England by machinery, two rollers with dies being employed for the purpose. One-half the impress was made in each roller where they came in contact, the blanks were fed in at the top, and the finished nails dropped out below as the steel rollers revolved.

J. J. L., of N. Y.—We believe the "Coach-maker's Magazine" is no longer published. Its former editor, Mr. Saladee, has removed to Texas.

J. C., of Va.—The paper you mention having sent to us we did not receive. The better way would have been to cut the article out and enclosed it with your letter.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Oct. 8, 1859:—

H. B., of —, —; W. A., of N. Y., $30; J. H. B., of Ind., $25; R. H., of N. Y., $32; A. J. B., of Ky., $30; J. C., of N. C., $25; Van H. & A., of Mo., $25; E. R. P., of N. Y., $30; D. C., of Pa., $30; N. D., of N. J., $30; G. W. K. B., of La., $165; S. A. S., of Mass., $25; A. R. R., of Mo., $30: A. N. M., of Ill., $25; J. A. E., of Conn., $27; B. B., of Md., $25; W. D., Jr., of Pa., $55; B. F. A., of Ky., $25; H. R. K., of Ohio, $25; A. R. B., of Conn., $25; H. W. C., of Conn., $25; I. H. L., of Ia., $25; W. H. B., of Pa., $30; D. B., of Ind., $25; G. H. P., of Ga., $25; J. E. L., of Conn., $35; I. A. B., of Ky., $25; J. S., of N. Y., $30; B. F. K., of Ala., $30; P. D., of R. I., $55; G. P., of N. Y., $23; G. W. B., of Pa., $30; G. K., of Pa., $20; O. P., of N. Y., $25; A. D. H., of Mich., $55; S. L. B., of S. C., $30; J. W. B., of N. Y., $55; B. R., of Mass., $15; I. W., of Ohio, $15; H. C. F., of Ohio, $25; J. K., of Mass., $50; H. P., of Mass., $25; J. H. K., of Iowa, $25; C. D., of Conn., $25; F. J. P., of Tenn., $30; I. P. T., of Maine, $30; D. W., of Mass., $25; L. M., of Wis., $29; J. L., of S. C., $40; O. E. W., of Mass., $40; N. S., of Mass., $25; L. T., of Wis., $25; Mrs. K., of N. Y., $40.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Oct. 8, 1859:—

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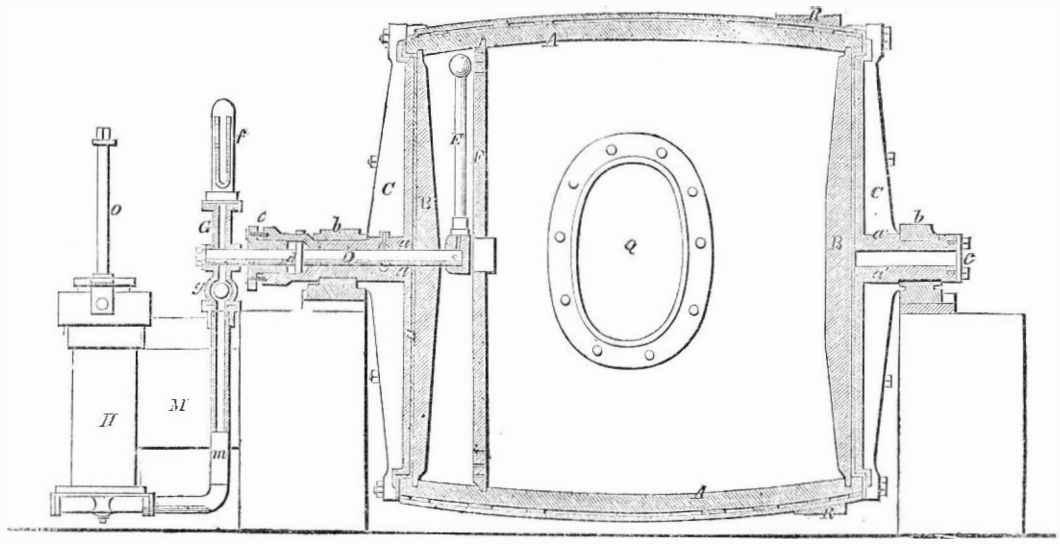
IMPROVED METHOD OF TANNING.

[Translated from the Bavarian Journal of Arts and Trades.]

It is well known that, by keeping the hides and the tanning substance from coming in contact with the air, the tanning process is materially facilitated. In order to effect this practically, the only way is to carry on the the tanning in vacuo.

The vessel in which the tanning substance is kept has to be made air-tight, and, at the same time, no metal can be used except the very expensive one, copper. Iron, as well as zinc, is affected by the tanning substance; wood can only be used if its pores have been stooped by some varnish, which effectually prevents the air from entering the vessel after it has been pumped out.

The vessel represented in the annexed engraving is constructed of oak planks or staves, and the engraving represents a vertical central section of the same.



KNODERER'S TANNING-APPARATUS.

The staves, A, of the vessel or barrel are of white oak, as also the two heads, B, which latter are covered externally by the two corrugated cast-iron plates, C. These plates are provided with trunnions, *a a'*, which have their bearings in the journal-boxes, *b*. The trunnion, *a'*, is hollow, and its end is closed by a cap, *c*. The trunnion, *a*, is also hollow from end to end, and a tube, D, of bronze or copper extends through the same, and makes the connection between the interior of the barrel and the air-pumps. Secured to the tube, D, and at right angles with the same, is the copper pipe, E, placed vertically, and protected from the hides in the barrel by a perforated false bottom, F. The barrel is rotated independently from the tubes, D and E, which latter remain stationary; and, in order to prevent the air passing into the barrel when the same is rotated, the tube, D, is provided with a shoulder, *d*, and the trunnion, *a*, is furnished with a stuffing-box, *e*. Another pipe, G, which is jointed to the tube, D, is provided with a stop-cock, *g*, and with a manometer, *f*, whereby the degree of the vacuum produced by the air-pump, H, can be ascertained.

The barrel has two apertures, P and Q; the former for the purpose of introducing the pipe, E, and this opening is hermetically closed by means of a stopper; the other aperture, Q, is the man-hole, through which the hides are introduced, and which gives access to the barrel for the purpose of cleaning the same.

The barrel is rotated by a belt placed over the wooden pulley, R, that is secured to the staves, Between the heads, B, and the cast-iron plates, C, two sheets of india-rubber are placed, and the outside of the staves is covered by a double stratum of gutta-percha, dissolved in a small quantity of spirits of coal-tar and linseed oil. This varnish is applied hot by a brush, and pressed into the wood by means of a smoothing-iron, whereby the pores of the wood are perfectly closed, and the air excluded, so that the vacuum produced by the air-pump is not disturbed during the whole term of the operation.

The operation is as follows: When the hides are taken from the wash, all the water contained in them is expelled by a powerful press. This done, the hides are placed into the barrel, together with the necessary amount of bark or other tanning substance. A sufficient quantity of water is added to keep the contents of the barrel moist. The man-hole is now closed, and the air pumped out as clear as possible. As the rarification of the air in the barrel proceeds, the pores of the hides are opened and prepared to receive the tanning substance. When the air has been rarified as much as possible, by the means already employed for this purpose, the stop-cock, *g*, is closed, and a piece of lead pipe is added to the conducting-tube, *m*. This lead pipe communicates with a tank that contains tanning-fluid of more or less strength, according to the quality of the hides in the barrel. If the stop-cock is now opened, the tanning-fluid, impelled by the atmospheric pressure on its surface in the tank, rushes with great rapidity into the barrel. The cock is closed as soon as sufficient fluid has passed into the barrel, and said barrel is now rotated for an hour or half an hour, according to the quantity of hides in the same. After two or three hours' rest, the rotation is continued for a longer time; and so on, diminishing the time of rest and prolonging the time of rotation, until at last the rotation is continued to the end of the operation.

By thus combining three actions—the rarification of the air, whereby the pores of the hides are opened, and the formation of gallic acid is prevented; the rotary motion, which facilitates the extraction of the bark, and which produces a continuous fulling of the hides; and the increased temperature which is produced by the motion, and whereby the combination of the gelatinous matter contained in the cellular texture of the hides with the tanning substance is greatly facilitated; by this combined action, the tanning of the hides is effected to perfection, and with a saving of time, which is fully established by the following table, based on actual experiments:—

	Time for tanning in vacuo, without motion.	Time for tanning in barrel, when rotated.
Calf-skins, from	6 to 11 days.	4 to 7 days.
Horsehides,	35 to 40 "	14 to 18 "
Light cowhides,	30 to 35 "	12 to 16 "
Cowhides, middling,	40 to 45 "	18 to 20 "
Heavy cowhides,	50 to 60 "	22 to 30 "
Oxhides, light and middling,	50 to 60 "	20 to 30 "
Oxhides, first quality,	70 to 90 "	35 to 40 "

At the same time, 75 per cent. of bark is saved by using the rotary barrel.

WATER-GAS AT WILMINGTON.

Several of our dailies have been dilating, with an unusual amount of unintelligent enthusiasm, on the subject of a display of what they call "water-gas," recently made at Wilmington, Del. The Philadelphia *Press* states that this gas is the invention of Professor Sanders, of Cincinnati, and describes it as follows:—

"Water, as steam, is decomposed by being passed over red-hot charcoal, and the resulting gases (hydrogen, carbonic oxyd and light carbureted hydrogen) are chemically combined with heavy carbureted hydrogen, or light-giving gas, by the decomposition of rosin or coal vapor, simultaneously with and in the presence of the decomposition of the vapor of water. At the Wilmington gas-works are now three water-gas retorts, aggregating only one twenty-seventh of the cubical area of their coal-gas retorts, yet more productive than the whole of their present coal-gas apparatus, making 1,200 to 1,800 feet per hour. The gas manufactured is superior in color and strength of flame to that produced from coal. Rosin is used as the carbonizing element, requiring from 25 to 40 pounds for every 1,000 feet of gas, which is free from sulphur or nitrogen, and has an odor rather agreeable than otherwise. Will it pay? The price of coal-gas in New York is $2.50 per 1,000 cubic feet; in Philadelphia, it is $2.25 for the same quantity. The cost of making 1,000 cubic feet of such water-gas as illumined—we might say, as illuminated—Wilmington, on Saturday, ranges from 30 to 50 cents per 1,000 cubic feet. Rosin alone need not be the basis, for Sanders' process covers the use of bituminous coal, lignite, or any of the multitudinous forms of hydro-carbonaceous material."

We present these statements because they are valuable as an able gaseous exposition of this alleged new production. In the first place, there is nothing new about this gas; and, in the second, it is not so good as gas from rosin, oil or coal. Gas made from the decomposition or water in one retort, and rosin in another, were fully described on page 285, Vol. 4, SCIENTIFIC AMERICAN, in nearly the same language as in the above extract. A patent was obtained for the manufacture of gas in this manner, by S. White, whose claims will be found on page 166, Vol. 5, SCIENTIFIC AMERICAN. The addition of the hydrogen of water to the heavy gas of rosin does not improve the quality; it merely dilutes it, and is like adding water to milk, to increase the quantity. An exhibition of this gas was given at the Fair of the American Institute, in Castle Garden, this city, in 1849, and several towns in England were lighted with it a few years ago; but we understand they all gave it up after a brief trial.

KANSAS GOLD. — The Denver City correspondent of the St. Louis *Republican*, of Sept. 25th, gives a statement of the receipts and shipments of gold, in various forms, by the prominent business-firms of Denver City and Auroria, showing the following aggregates:—Receipts, $73,000; shipments, $45,000. The valuation of the gold is at $17 per ounce, which is much below its real value.

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